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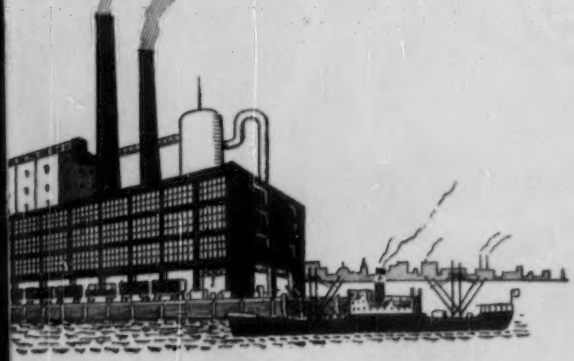

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ECONOMIC GEOGRAPHY

VOL. 31 OCTOBER, 1955 No. 4

HINTERLAND BOUNDARIES OF NEW YORK CITY AND BOSTON IN SOUTHERN NEW ENGLAND

Howard L. Green

Dr. Green is Assistant to the Vice-President in Charge of Retailing, of Stop & Shop, Inc., Boston.

THE concept of the metropolitan community upon which this study is based holds that a large city tends to organize the region surrounding it, that such cities enter into a relationship with their hinterlands.[1] The city is the focal point of regional activity, with the hinterland carrying on functions that are necessary to the metropolitan community as a whole. The purpose of this paper is to define and analyze the hinterland boundaries in southern New England between two such large cities, New York and Boston.

THE NEW ENGLAND REGION

The traditional concept of New England as a homogeneous metropolitan region focusing upon Boston has been increasingly questioned during the last quarter century. As early as 1930, Kent Hubbard, President of the Connecticut Manufacturers Association, suggested that Connecticut should leave New England because that state was farther advanced than the rest of New England.[2] A few months later, Frederick G. Fasset wrote, "If there was a New England as revealed by a common outlook, it has ceased to exist."[3]

In 1950, John H. Fenton stated that New England "appears actually to have been subdividing for the last twenty years" into three parts—Maine, New Hampshire, and Vermont forming one area; Massachusetts and Rhode Island another. Connecticut, however, "because of its geographical position relative to the metropolitan New York area, might be considered a third subdivision, possibly even embodying the best of the old New England tradition."[4] Fenton's informants based their opinions on "intangibles" and were "unsupported by statistics." Thus, despite widespread obituaries on the demise of New England, there has been little quantitative corroboration.

[1] McKenzie defined the territorial differentiation of functions in the metropolitan community as follows: "communications, finance, management and the more specialized commercial and professional services, are becoming more highly concentrated in or near the center of the dominant city; while other activities, such as manufacturing, the less specialized forms of merchandising, and institutions catering to leisure time activities, are becoming more generally dispersed throughout the region, in accordance with local conditions of topography, transportation and population pattern." R. D. McKenzie: *The Metropolitan Community*, New York, 1933, pp. 70–71. See also, N. S. B. Gras: *Introduction to Economic History*, New York, 1922, pp. 187–269.

[2] *Boston Evening Transcript*, November 12, 1930, p. 8.

[3] F. G. Fasset, *Boston Evening Transcript*, January 26, 1931, p. 15.

[4] J. H. Fenton, *The New York Times*, July 23 1950, p. 40.

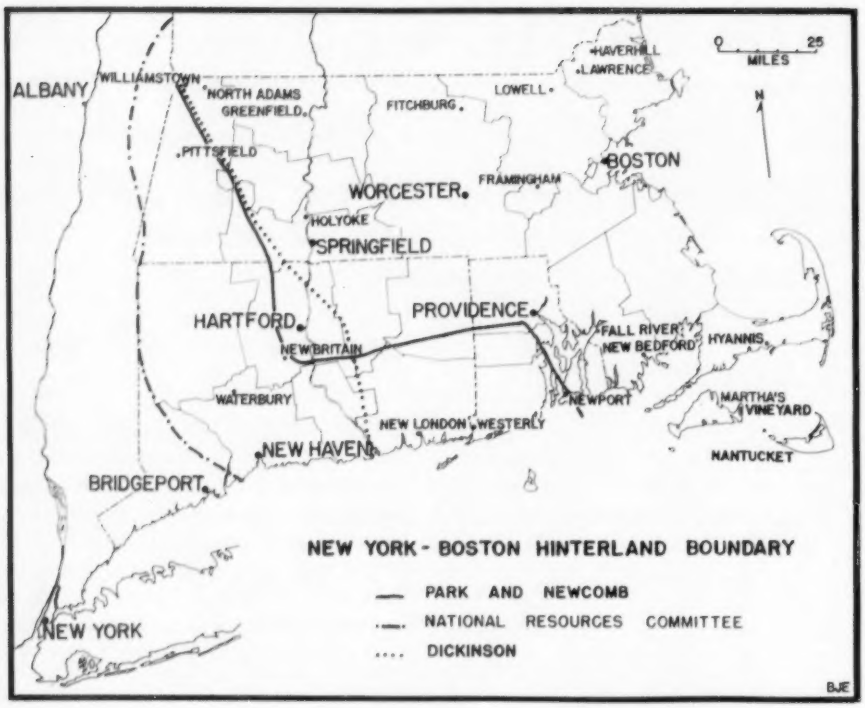


FIG. 1.

PREVIOUS DELIMITATIONS

Three earlier studies of metropolitan regions are examined here as aids to defining the hinterland boundary between New York City and Boston (Fig. 1).

Park and Newcomb

In "Newspaper Circulation and Metropolitan Regions," Park and Newcomb claim that the distribution of newspapers is related to the distribution of economic and social features; therefore, a map of newspaper regions measures social and economic regions.[5] To illustrate, they note a correlation between newspaper circulation and wholesale trade, and a further correlation between Chicago newspaper distribution and the sale of train passenger tickets to and from Chicago.

Park and Newcomb selected 41 cities as metropolitan centers (Federal Reserve cities and six others), picked the dominant morning newspaper as representative of the community, and mapped the newspaper's distribution. The boundary line lay at a point where one metropolitan paper replaced another as the dominant one. Audit Bureau of Circulations figures were utilized to give a common source of information.

For southern New England, *The Boston Globe* and the *New York Times* were chosen for study. The boundary between their areas of domination appears to run on a line from Williamstown,

[5] R. E. Park and C. Newcomb, Chapter VIII, pp. 98–110, in McKenzie's *The Metropolitan Community*, 1933.

in northwestern Massachusetts, to Westfield, near the Massachusetts-Connecticut state line. From there the boundary proceeds to a point south of Providence. Then the boundary curves seaward to the vicinity of Newport.

Questions arise: How representative is a single criterion—newspaper circulation—as a measure of the extent of a metropolitan region? Shall we assume that one function is so constituted that it can speak for the others? The author of this article believes that metropolitan newspaper circulation tells us about metropolitan newspaper circulation. It may be a clue, but only a clue, to other functions.

National Resources Committee

A second source of metropolitan regional delimitation is a study published in *Regional Factors in National Planning and Development.*[6] This report contains a map showing "Possible Planning Regions Based upon Metropolitan Influence." The boundary between the respective hinterlands of New York City and Boston runs along the edge of Fairfield County in southwestern Connecticut, coincides with the western Connecticut and Massachusetts borders, and includes a small part of eastern New York State opposite Williamstown as part of the Boston region.

The map, according to the report, is based upon studies of 96 metropolitan areas (1930 census definition) and 43 areas of newspaper circulation from metropolitan cities. However, it is difficult to see the relation between these criteria and the resulting regions. A study of the location of those metropolitan areas that lie in southern New England does not give the facts upon which to draw such boundaries, nor does the Park and Newcomb study of newspaper circulation yield results congruent with the map presented. The more important considerations, it appears, were the limits of the Federal Reserve districts and state boundaries.

Dickinson

Dickinson defined hinterland boundaries by analyzing and mapping various kinds of service areas.[7] The resulting boundary in New England places eastern Connecticut—Tolland, Windham, and New London Counties—in Boston's zone of influence, and continues toward the northwest, running between Hartford and Springfield and on across Berkshire County to the corner of Massachusetts.

That these three studies do not agree on the location of the boundary zone between New York City and Boston is obvious. In Massachusetts, the boundary may fall either east or west of Berkshire County; in Connecticut, boundary variations cover most of the State. One study includes part of Rhode Island in the New York area; the others do not. There is need, therefore, to define a usable boundary girdle.

THE APPROACH

In this paper, the boundary between the New York City and the Boston metropolitan hinterlands is determined from a study of the respective metropolitan functions of the two cities. Ideally, the most important metropolitan functions should be chosen as measures. In practice, however, this is impossible because of lack of data. Nevertheless, a variety of functional indicators can be measured that will provide a sample wide enough to establish the extent and importance of the two hinterlands. Measures of each of the following functions will be presented: transportation

[6] National Resources Committee, Washington, 1935, pp. 158–159.

[7] R. E. Dickinson: "The Metropolitan Regions of the United States," *Geogr. Rev.*, Vol. 24, 1934, pp. 278–291.

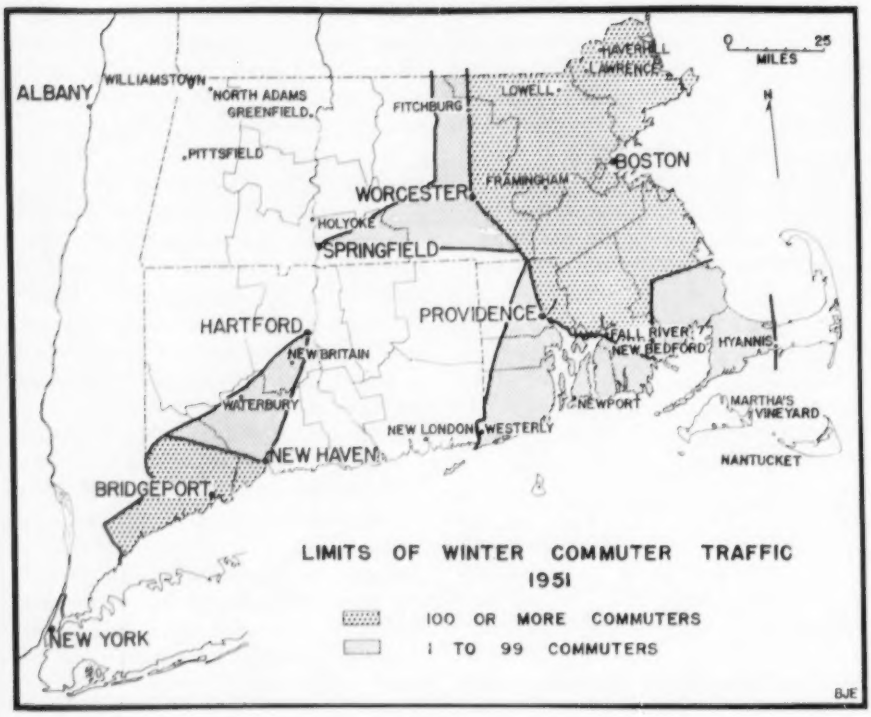


FIG. 2.

(truck, railroad, ship); communications (newspaper circulation, telephone calls); agriculture; recreation; manufacturing; and finance.

TRANSPORTATION

The revolution in transportation during the last century has altered both the size and shape of metropolitan regions. Formerly, ships from numerous coastal cities distributed products from small, circumscribed hinterlands to other coastal centers and to foreign ports. Then railroads, focusing upon any given center, spread the axial range of its metropolitan influence. Finally, motor transport, free from the confines of either a waterfront location or rails, diffused metropolitan influence into every hamlet.

To define the boundary of transportation flow, available data for three prime movers of persons and goods—railroads, ships, and motor trucks—are examined here.

Rail Freight

Because trucking is cheaper than rail transport for short-haul freight, little rail tonnage is carried between either New York City or Boston and intermediate points. Of almost two million tons of freight analyzed by the New Haven Railroad in one sample period, only 2½ per cent of the total was conveyed between New York City and southern New England points and about the same percentage between Boston and towns in this same three-state region. Since more than half of this small

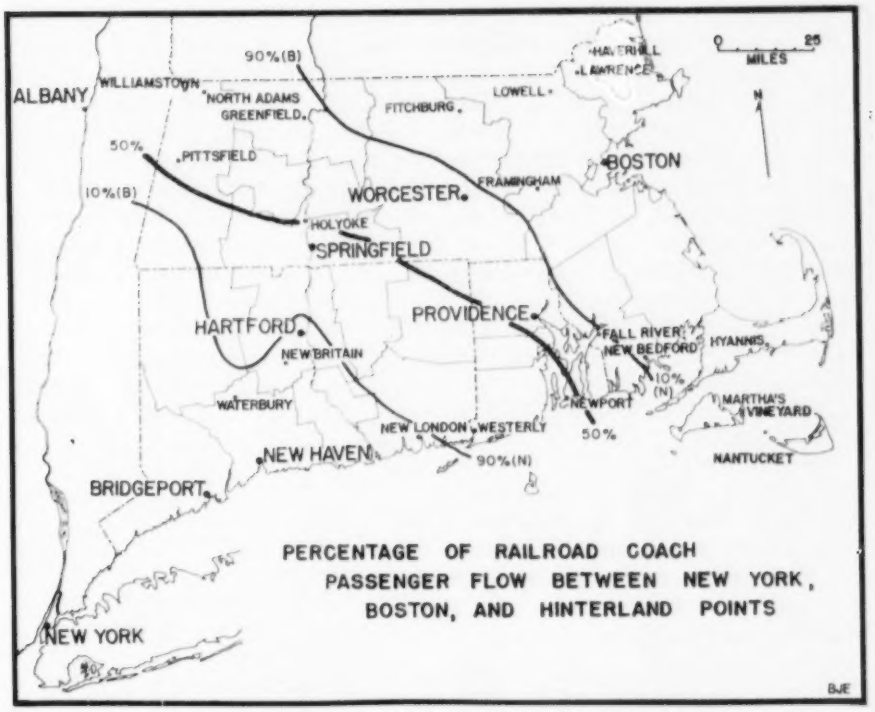


FIG. 3.

percentage of traffic is between New York and Boston themselves, rail freight movements between hinterland cities and either metropolis are of little importance.[8]

Rail Passengers

Passenger traffic, however, is more important. Data on point-to-point ticket sales have been compiled by the railroads of the region, although not all this information is gathered for the same period. In those places where information is recorded by different years, however, there appear to be few discrepancies.

Two factors limit the utility of the information. First, rail routes cover only specific points along the tracks. Isopleths of passenger traffic, therefore, are interpolations connecting known stations and passing through many points set at some distance from the tracks. A second limiting characteristic is the lack of direct connection at every station with both New York and Boston. Stockbridge, Massachusetts, for example, enjoys direct connections with New York City via the New Haven Railroad; in order to reach Boston, it is necessary to change at Pittsfield to a Boston and Albany train. Despite these limitations, the data offer a realistic picture of rail passenger traffic flow.

Both metropolises have well-developed zones beyond their built-up areas from which people commute daily. Major commuter zones are, of course, areas

[8] Conversation with Mr. John Ramsey, Research Department, New Haven Railroad.

with which a metropolis has a tightly knit community of interest. Places with 100 or more daily commuters lie largely within one and a half hours' travel time from each city (Fig. 2). From New York City, places with 100 or more commuters reach as far north as Danbury and New Haven, including the entire Connecticut panhandle. For commuters to Boston, the zone extends in an arc with a 40-mile radius including Fitchburg, Worcester, Providence, Fall River, New Bedford, and Plymouth. During the summer the belt is extended south of Plymouth to nearer portions of Cape Cod.

Beyond these limits are extremes set by a few hardy commuters: the extreme distance to New York extends northward in the Connecticut Valley to Hartford, a trip of over 100 miles each way; the extremes to Boston are almost as great. On the three rail lines leading into Boston from southern New England, the following are absolute points: Gardner, Massachusetts, on the Boston and Maine route (65 miles); Springfield, Massachusetts, on the Boston and Albany line (98 miles); and Westerly, Rhode Island, on the New Haven road (88 miles). Because time-distance accessibility is a prime consideration, it is not surprising that commuter traffic actually crosses the hinterland boundaries as determined by other measures.

For rail coach passengers, the boundary nearly bisects southern New England (Fig. 3). However, along the coastal route of the New Haven Railroad, the New York 90 per cent isopleth (of the total movement to New York and Boston combined) extends to New London, half the total distance to Boston, whereas the 50 per cent isopleth reaches almost to Providence. Along the inland route, via the Connecticut Valley, the 90 per cent isopleth for New York extends to Hartford, again half the total distance to Boston. Springfield lies within the New York zone, although eastward in Massachusetts, Boston rapidly becomes dominant. Boston's 90 per cent isopleth encompasses all of eastern Massachusetts. In the western interior the hilly country is largely oriented to New York with the breaking point near Pittsfield. Northward the territory is linked primarily with Boston.

Shipping

The dominant trend in shipping is an increased use of New York by New England shippers and a consequent decline of the port of Boston as an outlet. Actually, it is incorrect to speak of a hinterland for Boston, because there is no part of New England (with the possible exception of metropolitan Boston) that does not ship most of its exports via New York. In 1928, an extensive survey indicated that 65 per cent of New England's exports were shipped through New York and only 14 per cent through Boston.[9] Twenty years later, a study by the Federal Reserve Bank corroborated the earlier results: 81 per cent of the manufacturers queried shipped through New York, and only 12 per cent said that they shipped by way of Boston.[10]

The decline of Boston as exporter for New England, and especially that part of New England in which Boston enjoys freight rate advantages, is well known. The reason: a lack of bulk exports available for shipment through Boston. Most northeastern overseas shipments are composed of high-value manufactured goods, usually shipped in small

[9] C. E. Artman and S. H. Reed: *Foreign Trade Survey of New England*, Bureau of Foreign and Domestic Commerce, Dom. Commerce Series No. 40, Washington, 1931.

[10] A. P. Sullivan: "The Port of Boston," *Monthly Review*, Federal Reserve Bank of Boston, Vol. 32, No. 2, Feb. 1950, pp. 1–7.

amounts to any one specific destination. The Boston area is particularly deficient in bulk cargo; hence infrequent sailings are made from the port of Boston. Shippers, seeking full cargoes, use ports offering sufficient heavy cargo to fill out the load. This need is satisfied by New York, and New England manufacturers use the superior services of the larger port.

Among others, one further interesting factor contributes to the choice of New York: the unexcelled development of metropolitan functions. Many firms maintain export agents or departments in the city of New York. Often, also, marketing and administrative offices are centralized here. The sum of the banking, marketing, distribution, and transportation facilities located in New York City is a major attraction for shippers. Even with more favorable freight rates, it is doubtful that Boston could regain much of its lost tonnage.

It is impossible to delimit the import boundaries between New York and Boston. New York imports for the entire nation; it is the national terminal port *par excellence*. Though the port of Boston is a major foreign and intercoastal importer of such items as petroleum, sugar, and lumber, few of these supplies are destined for hinterland communities. Almost all of Boston's imports are utilized within the immediate environs of the city.[11] Eighteen other New England ports receive cargo for use in their local areas.

Truck Transportation

Statistical data relating to point-to-point motor freight movement are scant. Gathering accurate information is difficult, since over 300 independent motor carriers operate in southern New England and few operate between all points in the three-state region. These findings, therefore, gathered from trucking industry spokesmen, are informed estimates.[12] The resulting pattern gives Boston dominance within 35 miles. The remainder of the southern New England area has greater interchange with New York City. Providence, though near the boundary line, moves more tonnage to and from New York. Worcester and Fitchburg are the western limits of Boston's dominance of metropolitan freight interchange.

COMMUNICATIONS

Rapid and efficient communications have spread the influence of the metropolis over wide areas. The daily metropolitan press has become a powerful force in the acceptance of urban ideals and ideas throughout the larger community. The ability to talk person-to-person, provided by the telephone, has further extended commercial and social links with the central city.

Newspapers

Metropolitan newspaper circulation frequently is used to measure metropolitan influence. The choice of one or two newspapers from each of the two cities as a basis for measuring the extent of metropolitan influence would merely repeat the incompleteness of earlier studies. However, Audit Bureau of Circulations figures, published annually, afford a comparable measure of New York and Boston distribution. Such figures are tallied for each hinterland community for all newspapers.[13]

[11] War Department and U. S. Maritime Commission: *The Port of Boston, Mass.*, Port Series No. 3 (Revised 1946), Washington, D. C., pp. 301–306.

[12] From discussions with Mr. R. Woodbury of the New England Motor Rate Bureau, Inc., Boston, and Mr. H. Wagner of Malkin Motor Freight Co., Cambridge.

[13] Included are, for Boston, *The Herald-Traveler*, *Globe*, *Post*, and *Record-American*; for New York, *The Times*, *Herald-Tribune*, *Journal-American*, *World-Telegram*, *Post*, *Sun*, *Daily-News*, and *Mirror*.

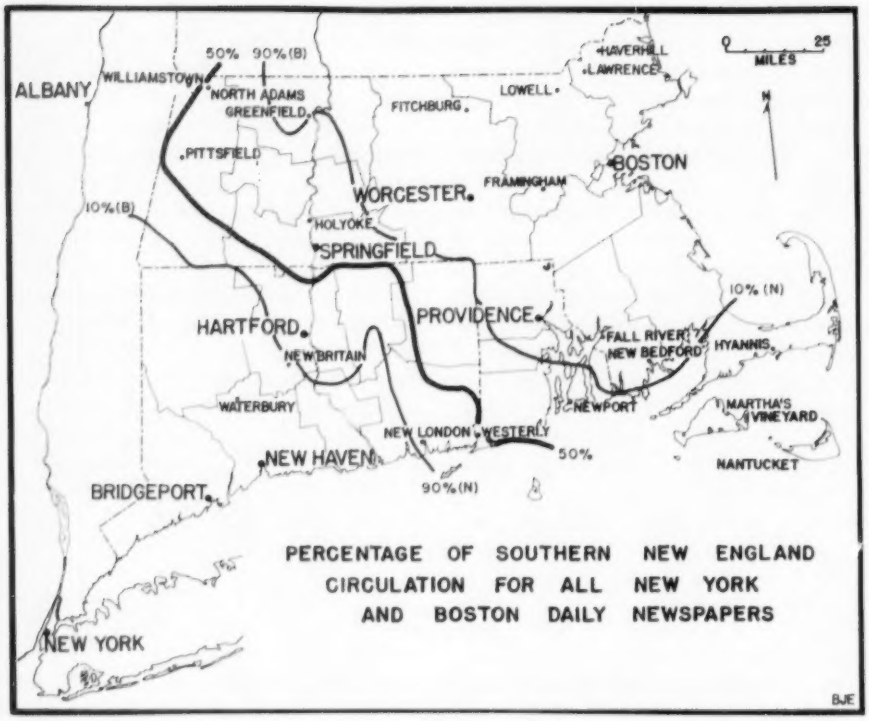


FIG. 4.

The information available in A. B. C. statements offers several problems of tabulation. First, Boston and New York papers are audited at different seasons of the year. Boston figures used are for the 12 months ending March 31, 1949, whereas the New York figures represent the year ending September 30, 1949. The variation introduced by this difference appears minor. A second difficulty of tabulation arises from the lack of uniformity of community names; the destination of New York papers in New England is listed by post office address, the destination of Boston papers in New England, by town names. For purposes of clarity, the data were reclassified by town names.

A final problem is posed by towns that are an integral part of a larger metropolitan area such as bedroom communities. To eliminate variations, data for each metropolitan area (as defined by the census) are gathered into a composite figure for the entire area.[14]

The resulting map indicates that the spatial transition between areas that lie distinctly within the New York readership zone and those that lie in Boston's are narrow and clearly marked (Fig. 4). At some points, the New York circulation drops from 90 per cent of the combined New York and Boston circulation to less than 10 per cent within the short space of 30 miles. The 50 per cent boundary lies slightly east of Williamstown in northwestern Massachusetts,

[14] For instance, the Brockton, Massachusetts, metropolitan area includes 11 towns, whose circulations have been totaled into one area figure.

veers westward to the New York border and recurves eastward to the Massachusetts-Connecticut boundary south of Springfield, continues across eastern Connecticut to the Rhode Island border and arches northward some ten miles along the immediate coastal fringe.

Areas of almost complete dominance by one metropolis or the other are large. New York circulation is over 90 per cent of the combined New York City and Boston circulation in all of western Connecticut and even the southwestern corner of Massachusetts. The Boston 90 per cent isopleth of metropolitan circulation also encompasses a wide area. It extends south from Greenfield in northwestern Massachusetts, runs along the eastern border of the Connecticut Valley in Massachusetts, and finally curves southeastward to the Providence area. Cape Cod, a popular New York vacation area, is not within the 90 per cent Boston influence zone.

The extent of intermixture of metropolitan papers in the Connecticut Valley is noteworthy. From Middletown and Meridan on the south to Greenfield on the north—a distance of more than 70 miles—neither New York nor Boston has 90 per cent of the metropolitan readership. Perhaps because of the large hinterland cities of Hartford and Springfield, roughly equi-distant from New York City and Boston, the region looks to both of the larger cities with some degree of interest yet maintains a semi-independent attitude.

The comparatively large circulation of New York papers in Boston's territory causes a less sharp transition on the northern side of the boundary. The national character of New York's papers, transcending regional bounds, may be one cause of this feature; the higher editorial quality of New York papers in comparison with the Boston dailies is another.

Telephone Calls

Though newspapers have been widely used as a measure of metropolitan influence, long distance telephone calls are an equally valid measure.[15] The excellence of telephone data lies in their comprehensive nature; they record both the economic and the social links of people separated by distance. In addition, they have three specific advantages over newspaper circulation: (1) Most newspapers make little attempt to push circulation beyond the trading area of their advertisers, whereas people make necessary telephone calls without consideration of trading area boundaries; (2) The telephone time-distance factor is reduced because telephone calls cover great distance with little elapsed time; (3) There is no problem of differences in quality (as with newspapers) affecting comparability. There is, however, one weakness in telephone call data: costs rise with increased call distances.

Two characteristics of the data affect the results. First, telephone call surveys are normally made during the summer, when long-distance calls are at a peak. The influx of New York City residents into southern New England during this vacation period increases New York City's proportion of the total in vacation areas, particularly in western Massachusetts, southern Rhode Island, and Cape Cod. Second, the two Bell Telephone Companies operating in New England gather data differently.[16] For all states except Connecticut, the sample includes day and night messages; in Connecticut, day toll message data only are available. Though this introduces a variation, the difference appears minor.

[15] Use of telephone calls as measures of the centrality of specific communities was suggested by E. Ullman, "A Theory of Location for Cities," *Amer. Journ. of Soc.*, Vol. 46, 1941, p. 858.

[16] The New England Telephone and Telegraph Company serves all New England except Connecticut. The latter is served by the Southern New England Telephone Company.

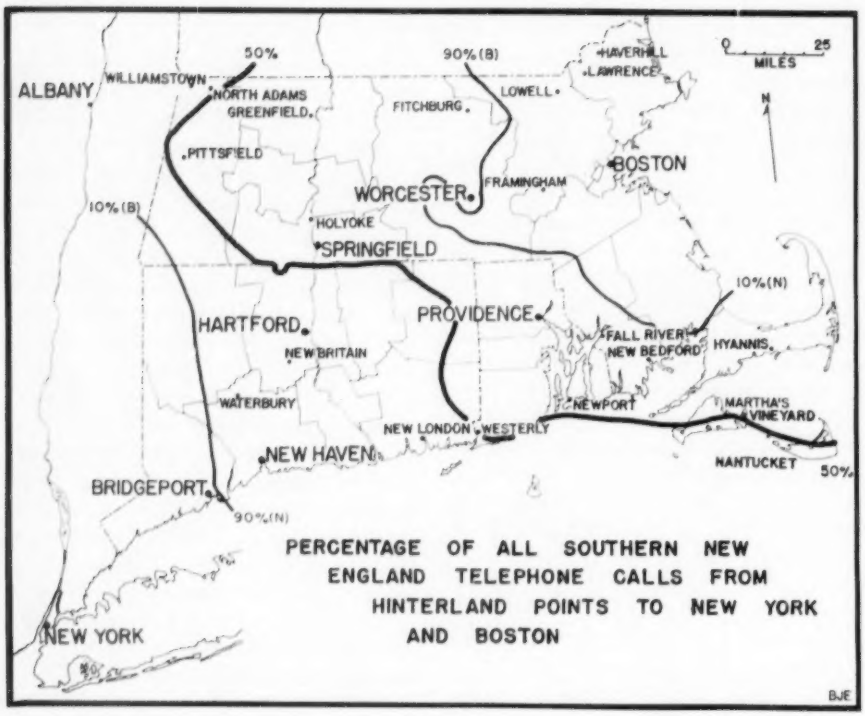


FIG. 5.

The 50 per cent telephone isopleth describes an arc from western Massachusetts along the Connecticut boundary to eastern Connecticut and then coastwise, bisecting Nantucket and Martha's Vineyard (Fig. 5). This line is similar to the newspaper boundary although the distance between isopleths is greater than that described by newspaper circulation. The New York City 90 per cent isopleth encloses Connecticut west of Bridgeport, whereas Boston's 90 per cent isopleth pre-empts eastern Massachusetts.

Calls between Boston and Connecticut River Valley communities are greater than anticipated. One possible explanation: calls between Connecticut subsidiaries and Boston administrative offices. A number of government agencies, for instance, with regional headquarters in Boston, have branch offices in Hartford and Springfield with which frequent contact is necessary.

AGRICULTURE

In less mobile eras, urban centers developed because of the ability of the agricultural hinterland to produce surpluses. Southern New England reverses this theme; agriculture exists only in response to the demands of the great urban population.[17] The result is that the largest agricultural production in the area—dairy products, poultry, and eggs—fills immediate needs of the nearby communities and is not of significance for comparing the hinterland boundary between New York City and Boston.

[17] "If the agriculture of New England had to be described in one sentence, that sentence would be that New England has the kind of agriculture that is commonly found near metropolitan centers." J. D. Black, *The Rural Economy of New England*, Cambridge, 1950, p. 228.

In the economy of southern New England, agriculture utilizes only a small proportion of the total number of wage earners. For all of New England, including the more rural northern states, agriculture, forestry, and fishing combined, accounted for only 6 per cent of the employed workers in 1940.[18] In the main, New England is dependent upon other parts of the country for the greater part of its food.

Despite the attention given to milk production, southern New England is a deficit area which must import dairy products in order to satisfy its demands.[19] Practically the total production is consumed in local centers, almost none of it going either to New York City or Boston. Connecticut and Massachusetts combined provide less than 1 per cent of the milk received in New York City.[20] Most of this originates on farms in the extreme western portions of these states. Nearly all of Boston's milk is produced in northern New England, with just a small amount coming from the Massachusetts area northwest of Boston.

Poultry and egg production in New England has recently shown a notable increase, so that today it competes with dairying as a major source of income for farmers. The Connecticut supply of eggs and broilers finds its terminus largely in New York City. The rising production in New Hampshire and eastern Massachusetts is destined for the metropolitan Boston market.

Other crop and livestock production in southern New England represents only a small proportion of farm income, and supplies the metropolitan New York and Boston markets with a negligible amount of their total food supply. There is no sharp line of demarcation between the agricultural marketing areas of New York City and Boston. The intermediate urban centers consume a major portion of the agricultural supply within their own immediate vicinities.

RECREATION

Both New York City and Boston experience a summer exodus of vacationers into the hinterland. Not all metropolitan inhabitants spend their vacations within the hinterland; in an era of automobiles and airplanes, many travel farther for recreation. Nevertheless, many inhabitants take vacations within their metropolitan regions. A statistical study by the New England Council makes it possible to map the home state of vacationers.[21]

The home states data do not yield specific facts about the resorts patronized by New York City and Boston residents. The total population of New York and New Jersey, however, is about twice that of the New York City Standard Metropolitan Area; likewise, the Boston Standard Metropolitan Area contains about one-half the inhabitants of Massachusetts. We assume in comparing home states that half of the Massachusetts vacationers are Bostonians and half those from New York and New Jersey are New Yorkers. This measure is rough but does suggest an answer.

[18] Black, *op. cit.*, p. 87.

[19] For complete discussions of the dairy industry, see P. McComas: *The New England Dairy Industry*, unpublished Ph.D. thesis, Harvard University, 1947; W. H. Brown: *The Economics of Dairy Farming in Southern New England*, unpublished Ph.D. thesis, Harvard University, 1949; and Black, *op. cit.*, pp. 292–382.

[20] *Report of the New York Milkshed Price Committee*. Transmitted to the Market Administrator, New York Metropolitan Milk Marketing Area, Feb. 1949, p. 166.

[21] By interviews and questionnaires, a large sample of resort proprietors were asked from what state the greatest number of their patrons come. For resorts located in Connecticut and Rhode Island, the proprietors' answers were tallied for the state as a whole, whereas, in Massachusetts, the results were recorded by county in which the resort is located. See New England Council, *New England Vacation Business Inventory*, Part 1, *Overnight Accommodations for New England Vacation Visitors, A Statistical Summary*, Boston, 1947.

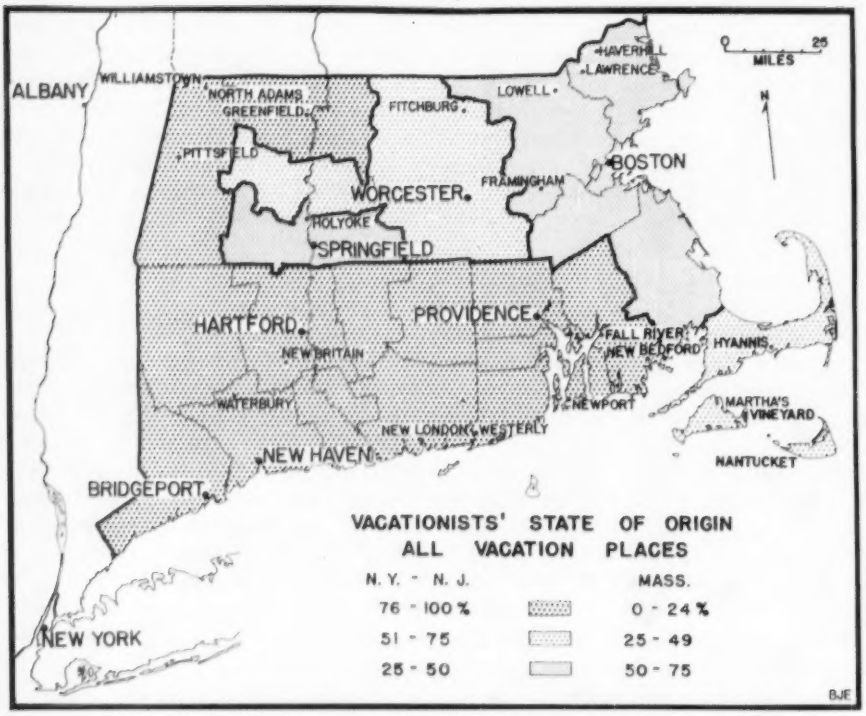


FIG. 6.

The results depict a two-pronged movement of New York–New Jersey residents during vacation seasons: one advance is made northward into the interior hill-country of Connecticut and Massachusetts; the other (probably representing more people) along the Atlantic shoreline toward Cape Cod (Fig. 6).

Massachusetts residents exhibit a similar type of movement although in a different region. The coastal movements extend southward along the Massachusetts coast to Cape Cod and northward to the Maine–New Hampshire shoreline. A second thrust runs inland toward the hill and lake country of New Hampshire. In Massachusetts, the one exception, Hampden County, is probably due to the inclusion of urban hotels in Springfield.

MANUFACTURING

Southern New England is primarily an industrial community; manufacturing provided 47 per cent of all employment in 1947, a resultant income of 726 dollars for each person in New England. The region's metropolitan orientation is analyzed in two ways—in the relocation of new plants in southern New England and in the directorship of large plants already located in the area.

Twenty plant relocations in New England recently were studied in detail by Ellis; eleven represented shifts into New England from other regions.[22]

[22] G. H. Ellis: *Postwar Industrial Location in New England*, unpublished Ph.D. thesis, Harvard University, 1949, pp. 160-175. See also his article "Why New Manufacturing Establishments Located in New England: August 1945 to June 1948," *Monthly Review*, Federal Reserve Bank of Boston, Vol. 31, No. 4, April 1949, pp. 1-12.

Nine of the 11 shifts were from the New York City area, whereas the other two, from greater distances, represented movements into New England to be closer to the New York City market. Though this sample is small, it indicates that a considerable proportion of the relocations in southern New England is the overflow of New York-oriented firms into the hinterland. Much of Connecticut's new industry—62 per cent of the firms established during the five years 1945–1950—are located in Fairfield and New Haven Counties, both within commuting distance of New York City.[23]

The geographic ties of members of industrial boards of directors is a second way of determining metropolitan orientation. If the business addresses of directors (of all manufacturing firms employing more than 500 persons in southern New England) is either in New York City or Boston, we assume that the metropolis has a hand in directing the management of the firm.[24]

On the basis of this measure, nearly all of the three-state area is more closely linked to New York City than to Boston (Fig. 7). The limits of Boston's dominance are Fall River–New Bedford on the south and Worcester on the west. To the north, there is a minor extension of Boston influence westward along the northern border of the state—an area with few industrial firms.

In Connecticut, major industrial hinterland centers have practically no ties to Boston (Table I). In only one firm out of 44 are there more Boston directors; 42 firms have more New York directors. In one, there is an equal number from New York and Boston. The Providence area in Rhode Island, though but 40 miles from Boston, has three firms with more New York directors to every one for Boston. In Massachusetts centers, Springfield maintains the three-to-one New York ratio seen in Providence, whereas the Worcester, Fall River–New Bedford, and Lawrence–Lowell areas are evenly divided between New York and Boston.

[23] *Connecticut Business Review*, Connecticut Development Commission, Hartford, 1950, p. 13.

[24] The basic source of information is *Poor's Register of Directors and Executives, United States and Canada*, New York, 1951.

FINANCE

The development of financial dominance is a characteristic feature of the fully-developed metropolitan center. Regional financial functions today are largely embodied in Federal Reserve banks. Federal Reserve banks keep on deposit the legal reserves of member banks. This metropolitan concentration of funds allows for quick movement of reserve money from the metropolis to hinterland cities if needed; powers are also available to drain money from hinterland cities, when it is in excess, into the metropolitan reserve. Machinery also exists for the inter-district movement of funds from one federal reserve metropolis to another. Thus, the present banking system in this country has established metropolitan financial functions in specific communities. Boston and New York are two such centers.

Two indicators shed light on this situation: (1) the votes by banks for choice of Federal Reserve City and subsequent adjustments, and (2) New York and Boston banks listed as correspondents of hinterland banks.

Federal Reserve Districts

In choosing sites for metropolitan regional Federal Reserve Banks in 1914, the Senate Committee charged with the responsibility polled future member banks on their three preferences of cities

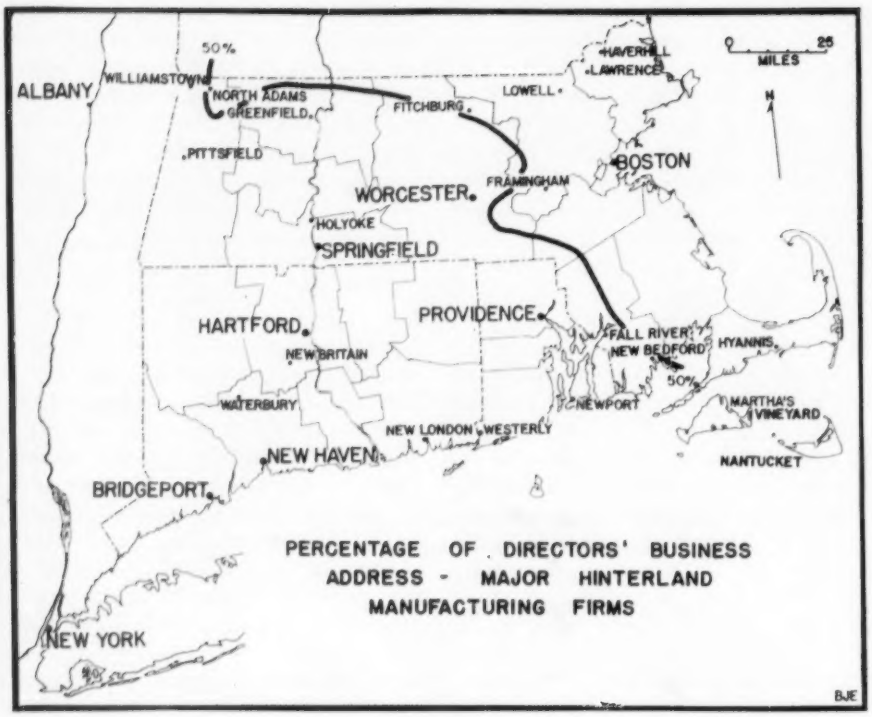


FIG. 7.

TABLE I

HINTERLAND FIRMS

(500 or more employees)

*Metropolitan Area**	*Number*	*New York or Boston Directors*	*More New York Directors*	*More Boston Directors*
CONNECTICUT				
Bridgeport	25	18	17	0
New Haven	14	10	10	0
Waterbury	14	9	9	0
New Britain–Bristol	16	3	2	1
Hartford	14	4	4	0
RHODE ISLAND				
Providence	46	32	24	8
MASSACHUSETTS				
Springfield	28	22	16	5
Worcester	9	6	3	3
Fall River–New Bedford	25	14	6	7
Lawrence–Lowell**	17	15	6	8

*Standard Metropolitan Area as defined in 1947 Census of Manufacturers.
**Standard Metropolitan Area as defined in 1950 Census of Population.

as Federal Reserve headquarters.[25] (Table II). The results of the first-place votes are particularly revealing: as early as 1914, only seven of 71 banks in Connecticut listed Boston as first choice. Even in Massachusetts, 17 of 154 banks thought New York a superior location. Among Rhode Island banks the 16 choices showed 11 banks favorable to Boston, four to New York; the other vote was cast for Providence.

Despite this vote, the Boston district was set up to include Connecticut. By 1915, however, the complaints of Connecticut banks forced alteration of the boundary so that Fairfield County was transferred to the New York district. Why was Connecticut placed within the Boston district? Possibly because this addition gave Boston a sufficiently large hinterland to equal in size most other reserve districts. The economy of the five remaining states could probably not offer sufficient reason to maintain a reserve bank in Boston.

Correspondent Banks

The number of hinterland banks listing New York or Boston houses as correspondents is another measure of metropolitan orientation, although a rough gauge. The difficulty with this criterion is that a New York correspondent may get 99 per cent of the business and a Boston bank but 1 per cent, yet both would be listed as correspondents. As an example, Hartford banks listed more than twice as many New York as Boston correspondents; yet one bank shows more than seven times as many checks from New York at a total value 14 times greater than checks originating in Boston [26] (Table III).

[25] *Location of the Reserve Districts in the United States*, Senate Document 485, 63rd Congress, 2nd Session, 1914, pp. 352–355.

[26] Brief prepared by Hartford Chamber of Commerce for Civil Aeronautics Board: *Statement of Facts Concerning Hartford, Conn., 1943*, p. 10.

Nearly all Connecticut banks list a majority of New York correspondents (Fig. 8). The sparsely settled eastern and northeastern parts of the state, closer to Boston, are less completely oriented to New York houses. In Massachusetts, the state borders are the boundary except for Williamstown in the extreme northwest and Springfield (where correspondents are equally divided between the metropolitan centers). Boston banks are dominant by at least two to one throughout the state, with several exceptions: Greenfield and Northampton in the Connecticut River Valley; Worcester; New Bedford; and possibly Cape Cod and southern Berkshire County (these two areas have few banks).

Rhode Island offers an interesting contrast. Whereas the southern half of the state appears in the boundary zone, and but slightly weighted on the New York side, Providence is strongly linked with New York City.

There is a marked tendency for large hinterland cities to show stronger links with New York City than smaller communities in the same general area. Springfield is evenly divided, although Holyoke is definitely oriented to Boston. Worcester is less strongly linked with Boston than its location would indicate; similarly New Bedford. Providence, but 40 miles from Boston, is most completely tied to New York City. These facts, and discussions with bankers, indicate that major cities in the area look toward the financial capital of the country rather than to the regional center at Boston.

A second major factor in delimiting correspondent bank boundaries appears to be the importance of state borders. With few exceptions, Connecticut and Rhode Island could be placed within the New York sphere, Massachusetts within the Boston zone.

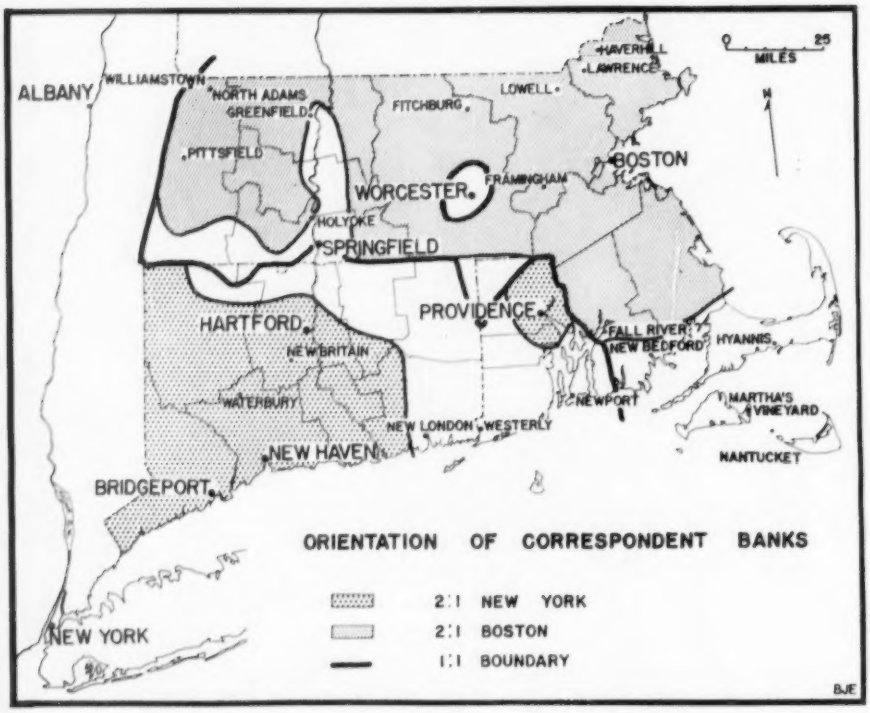


FIG. 8.

COMPOSITE BOUNDARY

Seven functional indicators presented in this paper can be synthesized to give a composite boundary. The indicators are: (1) railroad coach ticket purchases, (2) an estimate of truck freight movement to New York and Boston, (3) metropolitan newspaper circulation, (4) long-distance telephone calls, (5) metropolitan origin of vacationers, (6) business addresses of directors for major industrial firms, and (7) metropolitan correspondents for hinterland banks.

The median or middle boundary of the seven functional indicators measured stretches southwestward from the vicinity of North Adams to Pittsfield, then recurves in an arc, passing near Holyoke (Fig. 9). It arches northward from its southeasterly path to include Providence in the New York hinterland. Finally, this median boundary follows the Rhode Island–Massachusetts border to the sea.

TABLE II

FIRST CHOICE VOTE FOR FEDERAL RESERVE BANK CITY

Member Bank State	*Boston*	*New York City*	*Providence*
Connecticut	7	64	0
Massachusetts	137	17	0
Rhode Island	11	4	1
Total	155	85	1

Connecticut, with the minor exception of the extreme eastern section, is linked with New York by every measure. The northwestern tip of Berkshire County, Massachusetts, also shows a strong affinity for New York, as do southern coastal fringes of Rhode Island.

Of the three-state area, eastern Massachusetts alone is tied closely to Boston. This strongly Boston-oriented section is bounded on the west by the eastern border of Worcester County and on the south by the farther limits of Plymouth County.

TABLE III

CHECKS CLEARED BY ONE HARTFORD BANK, MARCH, 1943

Origin	*Number of Checks*	*Value*
Boston	993	$180,994
New York City	7,074	2,805,162

CONCLUSION

These results in part bear out the contention that Connecticut does not belong to the same region as Massachusetts. However, it is not just the proximity of Connecticut to New York City that is the reason for this realignment, as has been contended, but rather the close functional community of interest between the two. If the realignment of regions is to be based upon functional ties with metropolitan centers—nodal rather than homogenous regions—then most of Rhode Island and southwestern Massachusetts must also be included within the New York City region.

New England remains a regional name, perhaps connoting an area with a uniform historical development pattern prior to the era of suburban expansion, of the telephone, the automobile, the

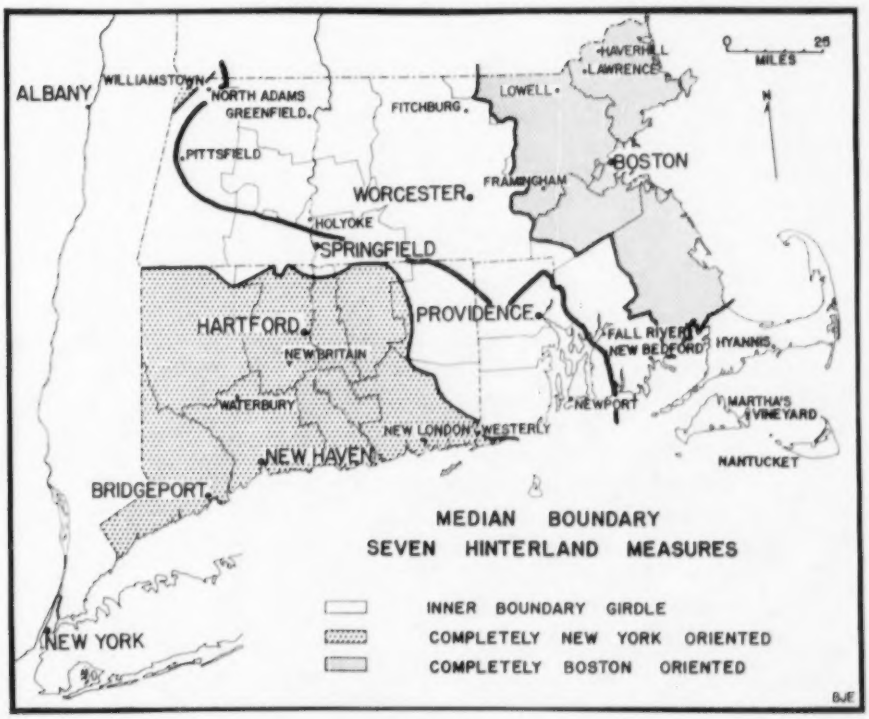


FIG. 9.

airplane, and the metropolitan centralization of management and finance.

ACKNOWLEDGMENTS

This paper is a revision of material appearing in the author's Ph.D. thesis, *The Reach of New York City and Boston into Southern New England*, written at Harvard University under the direction of Drs. Edward Ullman and Derwent Whittlesey. The author wishes, in addition, to express his indebtedness to Messrs. William Applebaum, Bart Epstein, and David Sanders who have read this manuscript and made many helpful suggestions.

THE AMERICAN CENTRALIZER BELT

Loyal Durand, Jr.

Dr. Durand, professor of geography at the University of Tennessee, is well known for his studies of the geography of the American dairy industry.

THE American Centralizer Belt is one of the main subdivisions of butter manufacture in the nation. It extends north-south from North Dakota to western Oklahoma, and lies in the eastern margin of the Great Plains and in the plains-border area to its east (Fig. 1). An eastward bulge, or extension, includes much of the southern two-thirds of Iowa. Nebraska, near the center of the north-south extent of the Centralizer Belt, is the heart of the region, and has long occupied fourth position among the states in butter manufacture (Table I).

A centralizer is a very large creamery, at which the cream from wide areas is "centered" for manufacture into butter. A centralizer draws its raw material in the form of sour cream from an extensive area, and reaches tens and hundreds of miles for its supply; in many cases cream is shipped as much as 400 or 500 miles to centralizers. The plant is "centered" also among hundreds of small cream stations, which act as intermediaries between the farmer who supplies the sour cream and the large company that manufactures it into butter.

The farmers of the plains-border area and the farmers and ranchers of the Great Plains are important producers of cream. This little-known activity of the plains extends from North Dakota to western Oklahoma, and westward in all of the plains states into the dry lands west of the 100th meridian—in fact into the eastern portions of Montana, Wyoming, and Colorado. Cream production is a feature of all of the agricultural regions; it occurs in the Spring Wheat areas of the Dakotas and Montana, the Corn Belt portions of South Dakota and Nebraska, the Hard-Winter Wheat Belt of western Kansas as well as the more diversified agricultural regions of the eastern part of the state, the Livestock Ranching areas of Wyoming and Colorado, and in the wheat regions of northwestern and western Oklahoma. Only on the south, where cotton begins to enter the scene in central Oklahoma, does the milking of cows and the sale of cream cease to be important; here the patterns of the Cotton Belt begin to hold sway.

The production of cream and the manufacture of butter in the five states from North Dakota to Oklahoma—the core of the American Centralizer Belt—is important enough to account annually for some 15 to 18 per cent of the butter manufacture of the United States (Table II). The proportion would be higher if the centralizer manufacture of Iowa were added; in this state the very large butter output—third in the nation—is the result of the "normal" butter manufacture in the northeastern dairy region of the state (part of the Tri-State Butter Region of Wisconsin, Minnesota, and Iowa) and the centralizer as well as small-creamery manufacture of southern

TABLE I

FIFTEEN LEADING STATES IN BUTTER PRODUCTION, 1923 AND 1953

1923	*Lbs. (000)*	*1953*	*Lbs. (000)*
1. Minnesota	199,926	1. Minnesota	267,664
2. Iowa	151,407	2. Wisconsin	205,716
3. Wisconsin	139,895	3. Iowa	187,296
4. California	81,943	4. NEBRASKA	76,988
5. Ohio	79,195	5. Missouri	66,332
6. NEBRASKA	76,748	6. Ohio	65,567
7. Michigan	64,818	7. Illinois	57,730
8. Missouri	51,818	8. Michigan	54,303
9. Indiana	51,484	9. NORTH DAKOTA	50,118
10. Illinois	51,359	10. KANSAS	44,743
11. KANSAS	42,764	11. Indiana	38,001
12. SOUTH DAKOTA	27,447	12. New York	34,159
13. Washington	26,666	13. SOUTH DAKOTA	33,131
14. NORTH DAKOTA	23,355	14. OKLAHOMA	29,784
15. New York	18,893	15. California	28,482
United States	1,252,214	United States	1,411,814

and western Iowa. The present paper deals only with (1) the so-called Centralizer Belt of the plains-border states, excluding Iowa—*the* Centralizer Belt of the butter trade—but (2) includes those Iowa centralizers on the Missouri River (such as in Sioux City), as these draw their cream in large part from the plains-border states west of the Missouri as well as from their home state.

FIG. 1. The location of the 98 centralized creameries, or centralizers, in the plains states and in Iowa. The 81 centralizers of the five plains states and the Missouri River cities constitute the manufacturing units of the American Centralizer Belt. Note the concentration in the state of Nebraska, and in Omaha and Sioux City.

THE CENTRALIZER BELT IN THE NATIONAL SETTING OF BUTTER MANUFACTURE

Butter manufacture in the United States is an activity essentially of four regions, although scattered production is widely dispersed. Two of these regions are in the dairy belt proper; two are to its south and west. The four are: (1) the Tri-State Butter Region of western Wisconsin, northeastern Iowa,

TABLE II

PRE-WAR AND POST-WAR PERCENTAGES OF U. S. BUTTER PRODUCTION IN THE CENTRALIZER BELT

Year	*Centralizer Belt*
1921	14.1
1923	14.7
1925	15.2
1927	15.7
1929	16.5
1931	16.5
1933	17.5
1935	15.9
1937	15.6
1947	18.8
1949	16.0
1951	18.4
1953	16.6

and Minnesota—the leading producing region by far; (2) the dairy regions of the lower peninsula of Michigan; (3) the Corn Belt from Ohio westward to the Missouri River; and (4) the Centralizer Belt.

The manufacture of butter in the two first-named regions is engaged in by privately-owned and cooperative creameries which manufacture sweet cream butter. Both regions lie in the dairy section, and the production of cream is large enough to support a dense network of creameries (Fig. 2). Ample supplies of cream are available within short distances of the plants, and the cream is received daily by the factories, or whole milk is received, the cream is separated, and the skim milk is dried and powdered.

Corn Belt butter production is widely scattered from Ohio westward. The creameries of the region produce both sweet and sour cream butter, the former having increased in importance rapidly in recent years with the advent of mechanical refrigeration upon the farm. Privately owned and cooperative creameries are common throughout the Corn Belt, and true centralizers are found here and there, with their relative importance and increasing share of the output rising westward, particularly into southern and western Iowa.

Finally, the Centralizer Belt, main region of the type of plant from which it receives its name, lies to the west of the true dairy region and the Corn Belt (but includes the Corn Belt of Nebraska), and extends southward into Kansas and Oklahoma. This region is dominated by the large centralizer (Fig. 3), although smaller creameries are by no means absent. It is characterized basically by the manufacture of sour cream butter in huge plants

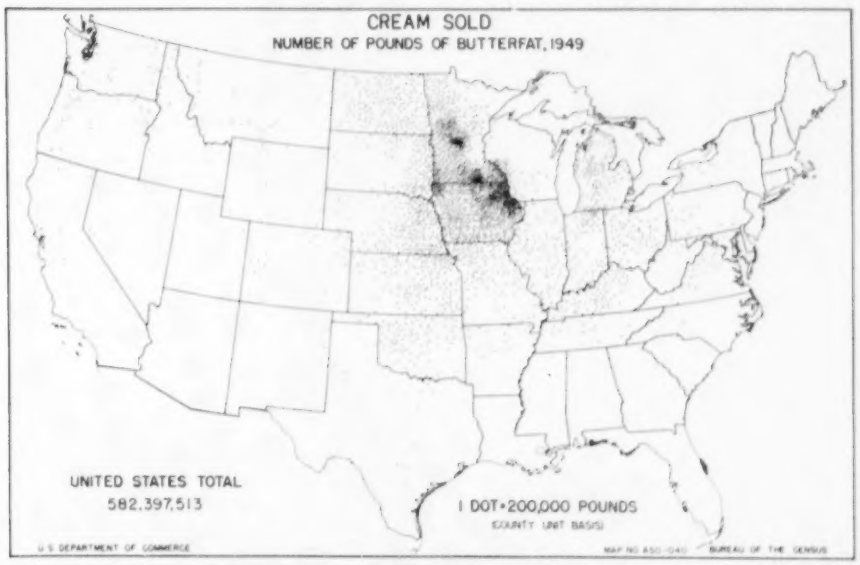


FIG. 2. The Tri-State Butter Region and the American Centralizer Belt are well outlined by the map of "cream sold" except for that part of the first-named region in western and northwestern Wisconsin. This is because Wisconsin creameries generally purchase whole milk rather than butterfat, and powder the skim milk. Note the rather sharp southern and southwestern boundary of "cream sold" in Oklahoma. Texas lies both to the south and west of significant production. (*U. S. Department of Commerce, Bureau of the Census.*)

FIG. 3 (upper left). Part of the buildings of a centralized creamery located in the wholesale district of the city of Omaha. The setting of centralizers is completely different from that of the rural or small town creameries that characterize the Tri-State Butter Region.

FIG. 4 (upper right). Typical small dairy herd on a livestock farm in southeastern Nebraska, near Seward. The cattle consist of grades of several breeds, plus Red Polls.

FIG. 5 (lower left). A cream station that deals in several products. Empty returned cream cans are stacked awaiting farmer pick-up. Although there is a centralizer in the town where this cream station is located, the station ships its sour cream receipts to Omaha.

FIG. 6 (lower right). A small creamery on the edge of the Nebraska Sand Hills. This plant, in addition to its own manufacture of butter, serves as a cream station for the collection of sour cream for a centralizer nearly 300 miles away in Minnesota.

located in urban settings, by thousands of country hamlet and small town cream stations, by intricate transportation patterns for movement of the cream from cream station to centralizer, and by the production of very large quantities of butter per plant. This is a region of "big business" urban creameries, and many of the centralizers are operated by national organizations in the dairy, poultry, meat, cold storage, and food-freezing business. As a whole,

the creameries of the Centralizer Belt are as unlike those of the Tri-State Butter Region as the Belt's wheat and livestock farms and ranches are unlike the latter's dairy farms. Yet the region's grain and livestock farms produce the "side-line" cream that supports the centralizers, and that provides a significant source of income for the plains farmer—be he principally a wheat grower, cattle feeder, livestock rancher, or general farmer.

THE ORGANIZATION OF BUTTER MANUFACTURE IN THE CENTRALIZER BELT

The cream from local areas is delivered to cream stations by the farmers. In turn the cream stations ship the cream to centralizers. All movement is in cans (usually 10-gallon ones), and the bulk of the movement is west to east. Finally the manufactured butter, usually in bulk and in cartons, moves eastward by rail from the centralizers to the urban markets of the eastern United States. Four elements constitute the framework of the industry—the farms producing the cream, the cream station, the railroad (and some truck) lines from cream station to centralizer, and the manufacturing plant itself, generally some distance removed from both farm and cream station.

The Farms

The core of the butter industry in the Centralizer Belt is the farmer who produces and sells cream (Fig. 4). Invariably this cream production is a "side-line" activity on a farm or ranch whose basic organization is for some other purpose. The "dairy" end of the business provides a small but steady year-round income in a region whose other income is obtained at irregular intervals—as when the wheat is marketed, the range cattle are sold to feeders, or the feeder cattle or swine are sold to packers. The cream check, in this respect, is not unlike the widespread activity in the year-long sale of surplus chickens and eggs by the women of the farm family. Collectively, throughout the Centralizer Belt, the total production of cream is large but the amount contributed per farm is relatively small; and yet the overall valuation reaches figures of five per cent or so of the *total value* of all farm products in a region of generally high valuation (Figs. 7 and 8).

The percentage of farmers marketing cream in the Centralizer Belt is high. Areas wherein more than 70 per cent of the farms produce and sell cream include nearly all of central North Dakota, several locations in eastern South Dakota, and northeastern Nebraska as well as the central Platte River valley (Fig. 9 and Table III). In some counties the figures rise to more than 80 per cent (Table IV). The 50 per cent isarithm encloses nearly all of North Dakota, the eastern half of South Dakota, most of the eastern two-thirds of Nebraska, and the northern one-third of Kansas. In addition, a considerable portion of west-central Oklahoma is an "outlier" wherein more than half of the farms sell cream.

The local patterns of cream production vary widely, as might be expected in a region as large in area as the American Centralizer Belt. Some farmers maintain three or four grade dairy cows for this purpose. Many farmers maintain a herd of dual-purpose (beef and dairy) cattle, such as Red Polls, Polled Durhams, or Milking Shorthorns, and milk some or all of the cows. A large number of producers milk some of their beef cattle during the summer—a common practice of many livestock farmers is to milk five or six of the beef cows (often picked at random, or cows

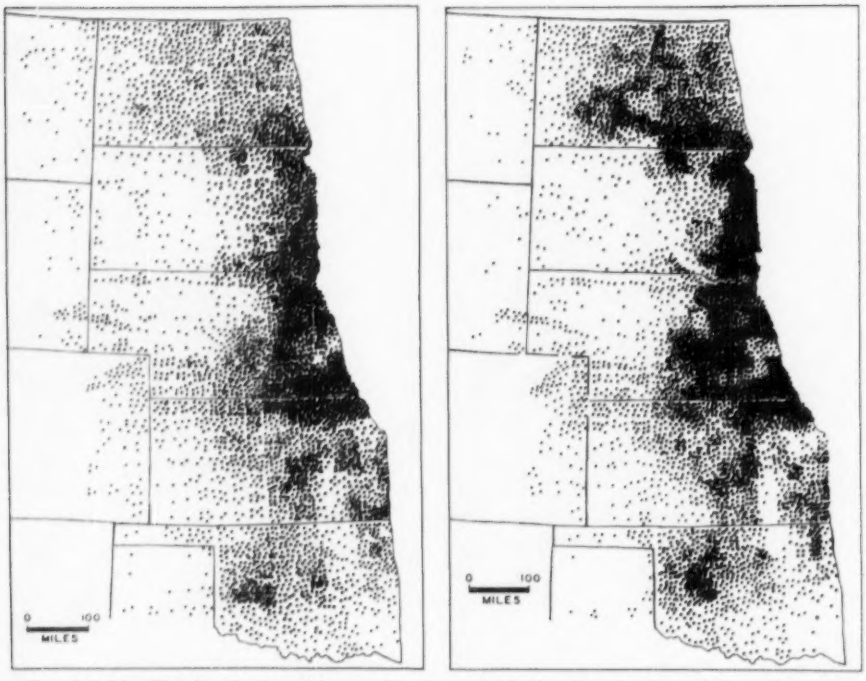


FIG. 7 (left). The distribution of farms selling butterfat in the plains-border and Great Plains area, each dot representing 50 farms, 1949. The sale of cream is widespread everywhere, but is more evenly dispersed throughout North Dakota than elsewhere. However, the varying size of land-holding affects the pattern—for example, the dots become more widely spaced westward in Nebraska and Kansas, a reflection of the increasing size of farm.

FIG. 8 (right). Butterfat sold in the Centralizer Belt, 1949, each dot representing 25,000 pounds. The concentration in eastern Nebraska and the widespread dispersal in North Dakota are prominent features. The "outlier" of important cream production in western Oklahoma possesses sharp boundaries and does not extend into the Panhandle of Texas. Areas of relatively small total production appear in the Badlands of South Dakota, the breaks of the Missouri River and in Indian Reservations in the same state, the Sand Hills of north-central Nebraska, and the Flint Hills of southeastern Kansas. The pattern here shown is more refined than that of Fig. 2, as that is based upon county units.

TABLE III

State	*Total Farms 1950*	*Farms Selling Cream, 1949*	*Per Cent Selling Cream 1949*	*Farms Selling Whole Milk 1949*	*Dairy Farms 1950 U. S. Census*
North Dakota	65,401	41,244	63.0	2,632	2,510
South Dakota	66,452	37,842	56.9	3,506	1,933
Nebraska	107,183	60,356	56.3	10,118	2,820
Kansas	131,394	53,473	40.6	22,797	8,534
Oklahoma	142,246	35,477	24.9	18,301	8,336
Montana (plains only)	18,097	5,424	29.4	780	331
Wyoming (plains only)	5,426	1,895	34.9	271	166
Colorado (plains only)	13,577	5,153	38.6	887	377

TABLE IV

AVERAGE PRODUCTION OF BUTTERFAT PER FARM IN THE LEADING COUNTY OF EACH STATE—SELECTION OF COUNTY BASED ON THE HIGHEST PERCENTAGE OF TOTAL FARMS SELLING BUTTERFAT, 1949 (*not on Total Production*)

County	*Per Cent of Farms Selling Butterfat*	*Average Production Per Farm, Pounds*
North Dakota—Logan	86	1,307
South Dakota—McPherson	85	1,049
Nebraska—Garfield	80	894
Kansas—Washington	68	787
Oklahoma—Roger Mills	58	708

that have lost their calves), and rear the other cows for beef alone. This last is customary in livestock ranching areas, also. On the smaller ranches (under 4000 acres) of the Nebraska Sand Hills from 12 to 15 cows (out of 50 to 75) per ranch are milked in the summer, and two to three or more ten-gallon cans of cream are produced each week; the cream check is important to these ranchers because their hay acreage is so small that a large herd cannot be carried through the winter, with resulting lessening of income. The large ranchers (4000 and more acres), however, usually specialize in beef alone, or milk but three or four cows, and sell only the surplus cream not needed at home. On some of the lighter-soil areas of western Oklahoma, the cream check is virtually an "insurance income" in a region where the wheat crop may fail, and where the season is marginal for cotton. All told, the patterns and explanations vary widely. Only in eastern and southeastern Kansas (the area of greatest concentration in the sale of whole milk) is dairying recognized as an element of the regional economy in types-of-farming studies.[1] Here the generally poor soils have been a factor leading to large acreages of hay, with associated livestock enterprises both to utilize the hay and pasture and to aid in soil improvement.

The milk production per cow is not as large in the Centralizer Belt as in the American Dairy Region. This is the result of many factors, particularly, however, the "side-line" activity and the lack of attention in breeding, selection, and even feeding. Crop farmers place their major emphasis on the crops, livestock farmers devote

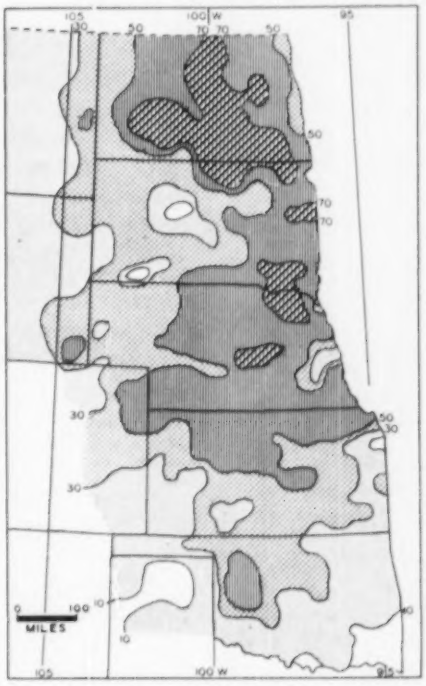


FIG. 9. The percentage of farms selling cream, 1949. Isarithms are drawn for 10, 30, 50, and 70 per cent. Based on half or more of the farms selling butterfat, the core of the Centralizer Belt extends from the Canadian Border through the northern one-third of Kansas, and has an "outlier" in western Oklahoma. The intensive region extends westward to beyond the 100th meridian, except in central South Dakota. Note the importance in northeastern Colorado. The 30 per cent isarithm lies at about the 105th meridian in Montana and Wyoming.

[1] United States Department of Agriculture: *Generalized Types of Farming in the United States*, Washington, 1950, pp. 7 and 28.

their major attention to the beef cattle or swine. The lower production is also the result of the widespread use of dual-purpose or beef breeds of cattle for dairying.

The milk produced by the farmers of the Centralizer Belt is separated on the farms. The cream is cooled and stored on the home farm until the time of its delivery and sale to the cream stations, which may be only once or twice a week—not a detrimental factor in an area manufacturing sour cream butter. The skim milk, by-product of the separation, is used as feed for chickens, calves, and swine but nowhere meets the total feed requirements, considering the generally small total production per farm.

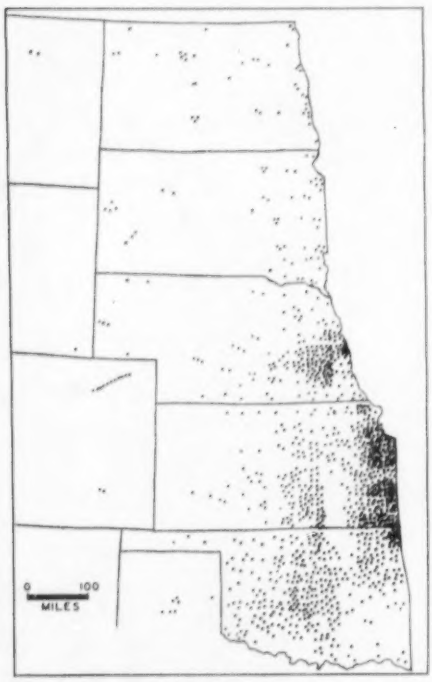


FIG. 10. The farms selling whole milk do not contribute to centralizers. Their market is at creameries manufacturing sweet-cream butter, at condenseries, cheese factories, or at the dairies of city milk distributors. The number of such farms (each dot indicates 50) increases southward in response to the larger urban populations of Kansas and Oklahoma than in the northern plains. The Omaha and Lincoln milksheds overlap in southeastern Nebraska. The concentration in extreme eastern Kansas reflects in part the Kansas City milkshed, and in part the existence of condenseries and other plants using whole milk. In effect this region, east of the Flint Hills, does not actually belong in the plains-border setting. Note from Fig. 9 that parts of it are east of the 95th meridian. The widespread dispersal of farms selling whole milk in Oklahoma reflects Texas as well as Oklahoma city markets; on occasions Texas cities have temporarily drawn cream supplies from as far as southeastern Nebraska (and even Wisconsin).

Negatively, two types of farms producing and selling milk do not contribute to the centralizers. These are the true dairy farms, which are very few in numbers, and are producers principally of whole milk for the urban centers—such as Omaha, Lincoln, Wichita, Oklahoma City, and others—and the farms which sell whole milk to small creameries (manufacturers of sweet cream butter), to condenseries, and to an occasional cheese factory (Fig. 10). The number of such farms increases southward in the Centralizer Belt, a response to the larger urban population in Kansas and Oklahoma than in the three northern states, and to the existence of condenseries in the extreme east of Kansas, an "overflow" from the dairying of the Springfield Platform of Missouri.

The Cream Station

The cream station is located in a hamlet, village, or city. It is the receiving point for cream delivered by the farmer, and it forwards the cans of cream to the distant centralizers. A large cream station, located in a productive "cream region," possesses this function alone (Fig. 11). More commonly, the cream station operator combines his business with some other, such as a grocery store, feed business, or poultry and egg-buying establishment (Fig. 5). Some of the small local creameries, which manufacture sweet cream

TABLE V

AVERAGE PRODUCTION OF BUTTERFAT PER FARM ON *the farms selling butterfat*, 1949

State	*State Production of Butterfat (000)*	*Average Production Per Farm, Pounds*
North Dakota	33,124	803
South Dakota	26,605	703
Nebraska	38,094	631
Kansas	32,041	599
Oklahoma	17,529	494
Montana (plains only)	2,344	432
Wyoming (plains only)	864	456
Colorado (plains only)	2,801	543

butter, also function as cream stations for the collection and forwarding of cream to centralizers (Figs. 6 and 14). The farmer delivers his cream in 10-gallon cans to the station at irregular intervals, whenever he happens to be in town. Truck collection is not common, except by the manufacturers of sweet cream butter, and so the centralizer depends upon the cream station as an intermediary between farmer and manufacturer. Some farmers, however, by-pass the cream station and ship their cream directly to the centralizer by rail.

Cream stations are operated both by individuals and by the centralizers. During 1952, there were 1131 licensed cream stations in Nebraska alone, 842 of which were maintained by centralizers and 289 of which were individual enterprises (Fig. 12). Competition is severe. Nearly all the larger towns and county seat towns of eastern Nebraska possess three or four cream stations, each operated by different centralizers; York possesses eight separate cream stations. Thus the receipts of cream at a given town may be routed to centralizers in several different locations—for example, the five cream stations of a given town may ship their cream to Sioux City, Omaha, Lincoln, Fremont, or Crete, depending upon the centralizer connection, or an individual station manager may route his cream to various outlets.

The Routes

The routes from cream stations to centralizer are generally west to east, and bear strong relationships to the railroad lines (Fig. 15). Centralizers in North Dakota reach into eastern Montana for part of their raw material. The South Dakota centralizers do likewise, and a centralizer near the western border of the state is strategically placed for cream from both Wyoming and Montana as well as from the environs of the Black Hills. The four centralizers located in Sioux City, Iowa, tap large areas to the west in Nebraska and South Dakota, and reach westward north of the Nebraska Sand Hills along the rail lines into Wyoming. The five centralizers located in Omaha compete with Sioux City for cream in part of

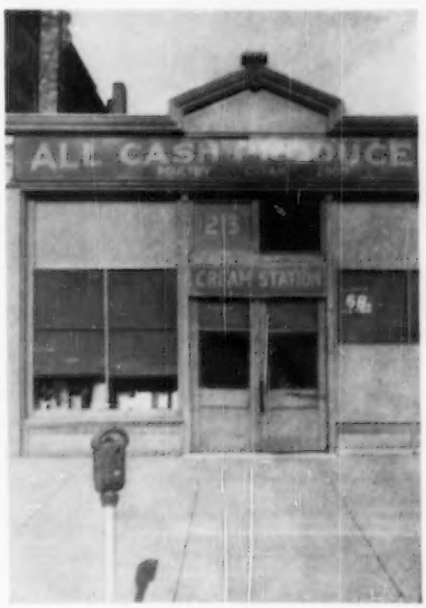
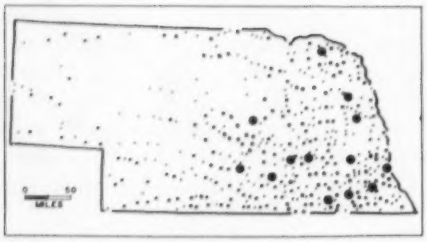


FIG. 11. An urban cream station, located on the edge of the business district in a city of 100,000 inhabitants.



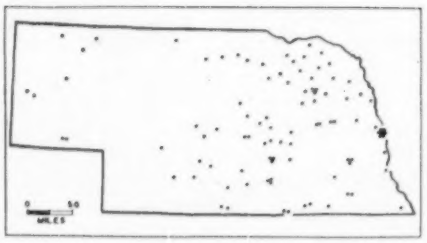


FIG. 12 (left). The location of the 842 centralizer cream stations in the state of Nebraska. The 289 independent cream stations are not shown. The small dot indicates a town possessing one cream station, the medium-sized dot one with two, three, or four stations, and the large dot a town with five or more cream stations. There are 13 towns possessing five or more, the maximum, eight, at York. Note the distinct orientation of stations (and towns) along the railroad lines in the western half of the state, where the railroad pattern is one of lines rather than a net.

FIG. 13 (right). The location of the 97 creameries of Nebraska. Compare this map with Fig. 1, which shows the 26 that are centralizers. In Nebraska the centralizers annually produce some 75 to 85 per cent of the butter. Many of the creameries are very small, comparable to that shown in Fig. 6, and their annual butter production is not large. Some of the creameries also serve, for all or part of the year, as cream stations for centralizers.

this territory, and draw upon a territory which fans out from Omaha into the Sand Hills and beyond into Wyoming on the northwest, throughout central and southern Nebraska and into Colorado to the west, into north-central and northwestern Kansas (via the Rock Island Railroad) to the southwest, and into northeastern Kansas on the south. The centralizers of eastern Nebraska compete with Omaha in much of the same territory, that at Lincoln being able to compete in northwestern Nebraska and northwestern Kansas (because of the railroad pattern) but not competing as greatly in south-central Nebraska. Thus the cream stations of northwestern Kansas are usually contributors of cream to centralizers in Nebraska rather than to those of eastern Kansas. The patterns become extremely complex in the southeastern one-quarter of Nebraska, in part because of the large total numbers of centralizers within a limited region, all of which compete with one another as well as with Lincoln and Omaha. In Kansas the west-to-east movement leads to the plants in the eastern part of the state, but routes are not as complex as in Nebraska, owing to the lower number of centralizers, as well as to considerable competition with local creameries. In Oklahoma the raw material does not go all the way eastward, as the producing and manufacturing region is in the western portion of the state.

There is some back-tracking of routes, and occasional cross routes—modifications of the generally west-to-east movement of cream. Some cream stations in western Nebraska and Kansas ship to Denver instead of eastward. Lincoln, Nebraska and Omaha to a certain extent, are unloading and transfer centers for cream coming in by rail from the west, but consigned to centralizers at such locations as Crete, Superior, or others "back westwards" via another rail line. Some centralizers tap distant cream stations through special services; for example, the plant at Crete, through an ice cream delivery service (three times a week during the summer, twice a week in winter), obtains cream as a back-haul from some non-railroad towns in eastern Colorado as well as from Yuma, Brush, and Wray, Colorado, 300 or more miles westward. Some special routes also funnel cream

from northwestern Kansas, as at Goodland and St. Francis, to southeastern Nebraska. North-south cross routes are usually short truck routes, and are particularly common in "nests" of centralizers, as in southeastern Nebraska. However, some are of considerable mileage; for example, a centralizer at Lincoln was receiving an average of 2000 cans of cream a week during the summer of 1952 from cream stations located in the neighborhood of Sioux Falls, South Dakota, 210 miles to the north.

The proportion of cream which moves by rail and by truck varies greatly among centralizers and locations. Overall estimates extend from two-thirds by rail, a figure of the large centralizers toward the eastern border of the region, to nearly all by truck at certain plants. The situation varies widely in a region as large as the Centralizer Belt, not only regionally, but among companies. In general the rail movements are the long distance west-to-east shipments, and the trucking movements are both the local ones—from not too distant cream stations—and the north-south movements, which are at right angles to the railroad pattern of the plains, except locally. Wherever rail lines funnel from a central point, as from Lincoln, Omaha, and Kansas City, the centralizer reaches to very distant cream stations.

The north-south cross routes are nearly all by truck. One of the centralizers of southeastern Nebraska has a truck route north into South Dakota, and south for 160 miles to Morris, Kansas. Another company, with more than one centralizer, concentrates its cream from cream stations north of the Platte River at one plant, and from south of the Platte at another location—all by truck routes, but the cream from the west is delivered by rail. Locally, the truck serves west-east routes, an example being in western Oklahoma, where the cream-shipping region possesses a sharp western boundary, and does not extend into the Panhandle of Texas.

The transportation question is ever present. Before World War II, a "cream train" ran several times a week from northwestern Nebraska to Lincoln and Omaha, delivering three to four carloads a trip at Lincoln, the remainder to the five centralizers in Omaha. Large truckers bid for the business, obtained part of it, and then "abandoned" their interest, and small truckers took over; meanwhile, the train had been discontinued, and routes and delivery points were considerably changed.

Much cream crosses state lines, and is manufactured into butter in a state other than the one of its source. It is difficult to determine the actual quantity of this movement. Nebraska, the leading state in centralizer manufacture, probably has more in-movement than out-movement of cream, in part because of the long-distance shipments from the states to its west and from Kansas, and in part because of the location of several large centralizers very close to the southern state line, the two in Superior being within two miles of Kansas.

The Centralizers

The centralized creamery is commonly a large brick structure. One whose function is purely that of butter manufacture may be one or two stories in height, and cover a quarter or so of a city block (Fig. 16). One which is operated by a company that is also engaged in other activities may occupy part of a four, five, or six floor building, the greater share of which is used for food processing or freezing, as a cold storage warehouse, or for some closely related enterprise (Fig. 17). In this

FIG. 14 (upper left). Advertisement of a Sioux City, Iowa, centralizer for its cream station in a small town of northeastern Nebraska.

FIG. 15 (upper right). A common scene at the railroad platforms of the urban centers of the Centralizer Belt. The tops of the cream cans are painted different colors, each representing a centralizer.

FIG. 16 (lower left). A centralizer engaged in butter manufacture alone. Note the cream cans stacked beside the doorway. This plant occupies about an eighth of a city block, and is situated at the edge of the wholesale district of the city.

FIG. 17 (lower right). The west side of a block-square plant engaged in butter manufacture, and in the poultry, meat, frozen food, and cold storage business. Recently the centralizer operations have been moved to an adjacent building. Various types of wholesaling establishments are near by.

case the entire building may occupy a half block, or even an entire one—in some cases more than one, with overhead bridgeways across the street. The butter-making portion of the establishment may occupy lower or upper floor locations, and its size cannot be determined by the external appearance of the building (Fig. 18).

The site of a centralizer is adjacent to rail transportation in nearly all cases. If slightly removed from the railroad lines, switching and trackage facilities to the plant have been provided (Figs. 19 and 20). This type of site is important principally for the shipment of butter and the receipt of fuel and manufacturing supplies rather than for the receipt of cream; the rail shipments from the cream stations move in cans in the baggage cars of trains, the cans are unloaded onto station trucks for transfer to auto trucks and transport to the receiving docks of the plants. At some times, when shipments are heavy, an entire railroad car filled with cream cans may be delivered directly, however.

The situation of a centralizer is usually in the wholesale district of the city, unless the town is not large enough to have sharply differentiated districts (Fig. 21). Those in Sioux City and Omaha are on the railroad fringe of the business district, and in clusters of various types of wholesale establishments not far removed from the Missouri River. Those in moderate-sized cities occupy a somewhat similar situation. In the smaller towns, the centralizer, however, may be the only good-sized plant along the rail line through the community.

The number of centralizers within the over-all Belt rises from North Dakota southward, culminates in the clusters in Nebraska, and then declines into Oklahoma. Nebraska has always been the "heart-region" of the Centralizer Belt, and, in fact, two of the now largest companies in the national dairy business in the United States originated as creameries in small Nebraska towns, developed centralizers, and have now expanded their dairy and food activities throughout the nation. Other companies, also originating in the state, have expanded into broad regional activities, and now operate both in the dairy business and in the frozen food business, and one has recently entered the national market in the preparation of frozen chicken and turkey pies, and other prepared frozen foods. The packing companies have entered the centralized creamery activity as an adjunct to their other operations, and several of the largest meat packers of the nation now operate centralizers in the plains-border area. Opposite in organization to the usual company or corporation in the business is a farmers cooperative creamery group in Nebraska which operates five separate centralizers, each a major plant.

The total number of centralizers in the American Centralizer Belt as outlined is 81. Of these, 26 are in Nebraska (five of them in Omaha, which claims to be the largest butter-manufacturing city in the world), 18 are in North Dakota, 11 in Kansas, ten each in South Dakota and Oklahoma, four in Iowa at Sioux City on the Missouri River, and two in Missouri on the river (St. Joseph and Kansas City). Those in Sioux City, St. Joseph, and Kansas City are included in the Centralizer Belt proper because their sources of cream are mainly to the west of the plants in the Great Plains and plains-border areas. Obviously the 81 do not represent all the centralizers in the butter industry; there are 21 in Iowa, only four of which are here included in the Belt (Fig. 1).

The manufacture of sour cream butter

FIG. 18 (upper left). Part of a centralizer in a Missouri River city. An overhead bridgeway crosses the street (along which there is railroad trackage) to other buildings of the plant, which is engaged in several activities. In the right foreground there is a cream station (beneath the sign) for local receipts of cream.

FIG. 19 (upper right). A centralizer in the wholesale district of a plains-border city. Railroad cars are shuttled into the entrance at the left.

FIG. 20 (lower left). A centralizer in a small city, with railroad trackage paralleling the side of the plant. The business district lies in the distance. Lumber yards, stock-shipping pens, warehouses, a flour mill, and the centralizer occupy the railroad frontage.

FIG. 21 (lower right). A centralizer in the wholesale district of a Missouri River city. Note the cream cans stacked under cover on the sidewalk. The butter manufacturing operations occupy part of the ground floor level in a building utilized principally as a cold storage warehouse. The low building in the distance is a railroad freight station, railroad tracks parallel the side of the plant, and railroad yards occupy part of the flood plain beyond. The opposite side of the street is lined with wholesaling establishments and warehouses—those of a national machinery company, a national plumbing supply company, and others.

in the centralized creamery represents a high proportion of the butter output of the plains-border states, and annually totals between 75 and 85 per cent of the butter made in Kansas and Nebraska. It must not be supposed, however, that the small privately owned or cooperative creamery, so characteristic of the main American Dairy Region, is absent; instead, however, of being a dominant feature it is overshadowed by the centralizer in size, but not in numbers, and its relative share of the regional butter output is small in comparison with similar plants in the true dairy region. North Dakota has 83 such creameries, South Dakota 69, Nebraska 71 (Fig. 13), Kansas 40, and Oklahoma 27 (Iowa 365). It will be noted that the smaller creamery operation is absolutely and relatively more important in the cooler northern plains where cream totals are somewhat larger per farm than in the central or southern plains (Table V).

MANUFACTURING AND MARKETING

The cream receipts at centralizers are usually greater during the spring, summer, and autumn than in the winter, and about two-thirds of the total cream receipts are in the months of March through September (Table VI). Summer is the season of maximum receipts and activity, and this reflects the addition of many farmers in cream production during this period. The "marginal" dairyman, one who milks beef cattle rather than dairy cows or dual-purpose cows, produces cream at this time, after his beef cattle have freshened during the spring.

The cans of cream, delivered at the receiving platform of the centralizer, are moved into the building by conveyor, or are lifted by inclined ones to a higher floor if the creamery operations are not on the first level. After being checked by cream stations (rather than farm producer), tested, weighed, and emptied into straining vats the cream is routed to the eight or ten cream tubs, and thence to the butter churns, and the empty cans are washed and returned by belt to the loading dock for transport by truck back to the railroad station. Cans received by rail one morning are usually returned the same night; cans received by truck route are stacked for return to the cream stations the succeeding day.

Centralizers operate four, five, even eight or more very large butter churns. Several workers are supervised by the chief buttermaker. Many churns are needed, both because of the size of the operation, and because the day's receipts of cream are manufactured immediately into butter. Only the late afternoon receipts are kept cool in vats or in hose-cooled cans for manufacture the following morning.

The churning of about an hour and three-quarters produces 1500 to 1600 pounds of butter. As the churn is unloaded, the butter is packed in bulk into cartons, each carton containing some 64 or 65 pounds of butter, and one churning yields some 24 cartons of bulk butter. After being checked and weighed, the cartons are sealed, and the outside is marked with the plant name, the number of the churn and the churning number and date of manufacture. The cartons of butter are then refrigerated and stored until the time of their shipment to the markets in the eastern United States or in California. The butter destined for local or regional markets, instead of being packed in bulk, is cut into one pound or quarter pound prints, wrapped, and placed in cartons that contain 32 one-pound prints.

The final cutting of the bulk butter into pound or quarter-pound prints takes place at the market, or at an

TABLE VI

NEBRASKA BUTTER PRODUCTION, 1953 (FROM U.S.D.A., AGRICULTURAL MARKETING SERVICE)

Month	*Pounds (000)*	*Per Cent of Annual Production*
January	5,518	7.167
February	5,246	6.814
March	6,162	8.004
April	6,729	8.740
May	8,243	10.007
June	8,676	11.269
July	8,011	10.405
August	7,039	9.143
September	5,740	7.455
October	5,071	6.586
November	4,991	6.482
December	5,562	7.224
Year	76,988	.....

intermediate cold storage warehouse. This is owing to the fact that the butter is sold in large quantities to market distributors, to chain store systems, and to similar outlets, and is wrapped in the labels and pound cartons of these companies. The companies that maintain centralizers and use their own name on the label usually market under the brand name, but with the national headquarters (such as Chicago or Omaha) listed; the actual place of manufacture cannot be determined without access to the code. The meat packers wrap in labels of their own, and distribute through their sales organizations and branch houses. Thus the advantages of large-scale production and mass selling to large distributors are enjoyed by the centralizers, but the name and location of the manufacturer may remain anonymous to the public.

The actual percentage of butter manufactured by centralizers in the American Centralizer Belt is large. The specific quantities are secrets of the individual companies, reported only through the required channels. The 26 centralizers of Nebraska manufacture some 75 to 85 per cent of the state's 77 million pounds of butter. An individual centralizer may make two million or more pounds of butter a year; figures of 1,200,000 to 1,750,000 are relatively common in the heart of the Centralizer Belt. Individual plants often manufacture 19,000 or more pounds of butter a day, and peak weeks (as in the flush season of late May and June) may witness a production of 65,000 to 85,000 pounds, or more. The five large centralizers in Omaha and the four in Sioux City account for the outstanding importance of these cities in butter manufacture.

THE DEVELOPMENT OF CENTRALIZERS

The present situation in the American Centralizer Belt has been presented. What developments of the past have led to the establishment of this type of plant, regionally so important in the plains-border area between the 95th and 100th meridians, beyond the intensive dairy regions of the nation?

The centralized creamery developed from "beneath," a grass-roots growth in the southeastern part of Nebraska. After one or two companies had successfully demonstrated the feasibility of the system, others followed suit, and then there came a period when centralizers were developed from "above," were built in favorable areas by companies from the outside, companies possessing the requisite capital and market contacts. Still later, other organizations which possessed existing market outlets, as the meat packers, built plants and added butter manufacture to their operations, and utilized existing sales personnel and outlets in its marketing.

The environment of the plains-border area during its period of early settlement was favorable for cream production. The first settlers of the plains-border region had migrated there from the eastern or middle western United States, or else directly from

FIG. 22 (left). A new centralizer in the American Centralizer Belt. Note the large trailer truck operated by the company.

FIG. 23 (right). The existence of centralizers has attracted several subsidiary industries to the cities of the plains-border region, many of them having established branches or founded plants from their headquarters in Wisconsin or elsewhere in the dairy region. Five centralizers are located within a few blocks of this company in Omaha.

northern Europe, principally the German and Scandinavian regions, but also from Bohemia. They were individuals who had been used to a cattle economy in their home regions, or at least had had acquaintance with the daily milking of cows. Although most of the settlers came with the thought of wheat uppermost in their minds, the need for a steady income during the seasons between wheat crops, the abundant natural pasturage in the form of unbroken prairie, and the vagaries of the rainfall and wheat yields (learned after a few seasons) made them receptive to an additional source of income. At the time, too, buttermaking in the household was a usual practice in the homes of the American settlers. Small creameries were soon established, and provided an outlet for surplus cream from the two or three cows of a settler, as well as a welcome source of cash income for him. Some of these became the forerunners of the present centralizers.

The quantity of butter produced in the plains-border area during and immediately following settlement days was very large. By 1880 nearly 22 million pounds of butter was made on Kansas farms, and nearly ten million on the farms of pioneers in Nebraska. During the ensuing decade, creameries were established. By the end of the ten years, the creameries manufactured six million pounds of butter in Nebraska, and over four million in Kansas, and farm production was even greater—46 million pounds in Kansas and 28 million in Nebraska. By the end of the decade, Nebraska was the eighth state in butter production, and was exceeded only by the older states of the Great Lakes area and the northeast. It was into this favorable environment that the creameries entered, a setting wherein cream production had been usual among the settlers, and wherein the making of butter in the farm home had been an established practice, transported from farther east or from Europe.

The grass-roots development of centralizers can be illustrated by the

history of one of the large companies, now a national organization. The development includes three periods—(1) the Gathered Cream Period, (2) the Skimming Station Period, and (3) the Farm Separator Period, the last the predecessor of centralizers. The farm separator was and is an absolute necessity for the system.

The forerunner of this company was a small summer-operated creamery, founded in 1884, at Fairmont, Nebraska. Cream was gathered by wagon from nearby sod-house farms, and a butter-maker was obtained to run the plant. The creamery prospered, and within six years the owners had purchased a nearby creamery (which had failed) and had built another one in a third location, redirecting part of the cream to the two additional operations. By the 1890's the cream-gathering period had merged into the skimming station period, the farmer now bringing whole milk to the plant. This necessitated expansion of the operations to be nearer the source of the raw materials, and the company built six additional creameries, all in southeastern Nebraska, a chain of 30 skimming stations, and established a sales office in a nearby larger town. Operations of the particular company soon were large enough to justify increased attention to sales, and a selling office was opened in Omaha in 1899.

The farm separator period opened with the invention of the cream separator. Although this had appeared in 1878, the first separators were large ones for the butter factories (it was this style used in the skimming stations) and it was not until the close of the century that smaller farm separators became common. During the period of 1900 through 1905 the company furnished separators to farmers to increase its cream supply. In addition to its existing creameries, the company had built more, and had added a plant in Omaha, but through its separator activities found the volume of cream large enough to handle centrally, and so, after the introduction and supplying of farm separators, built three "centralizers"—at Crete, Omaha, and Grand Island—and closed many of its small creameries. Management had been singularly successful in promoting eastern sales from its Omaha office, and the business and the centralizer mushroomed together, new plants being built with the expansion of sales. By the 1920's, the particular organization had built 11 more centralizers in several locations in Nebraska, Kansas, Iowa, and Oklahoma, and at one location each in South Dakota and Minnesota (the latter in the Red River Valley rather than in the dairying eastern part of the state). The furnishing of separators to farmers, an initial "pump-priming" device, had long since ceased to be necessary. However, to insure a cream supply, this company alone established over 3000 cream stations between 1906 and 1936, scattering them all over the plains area and in southwestern Iowa, in the farmer's home town. Soon other activities were added—the handling of eggs in 1908, poultry in 1910, the sale and delivery of retail milk in 1911, and others. Thus this company illustrates the movement from centralizers into associated activities, and into the ownership of its own freight cars. The history of other grass-roots companies somewhat parallels the pattern sketched; not all of the organizations have kept their central offices in the region, however, some having moved to Chicago.

The establishment of centralizers from "above" is illustrated by many organizations. These were originally in some food business—such as that of operating a cold storage warehouse, in the egg,

poultry, or meat business—and added the manufacture of sour cream butter to their interests. The success of centralizers, as demonstrated by the "grass-roots" companies, led them into the field. Very commonly the original creamery of such an organization was added to the existing building, such as the cold storage plant, and later a centralizer was built near by, after the founding of company cream stations or the tie-up with private stations had been completed.

PRESENT CONDITIONS IN THE CENTRALIZER BELT

The national butter market, price supports, competition with other fats and oils, and the surplus situation of the present affects the Centralizer Belt as well as the American Dairy Region. It is not the purpose of this paper to discuss these problems.

The farm production of cream can, and does, however, shift at present in accordance with the relative price situation. This is more true of the producers who milk beef cattle than of those who maintain dairy cows. If prices of cream are low (or price supports are lowered in the dairy industry) many producers cease to bother with the milking of cows—particularly if the prices of products which compete for the time of the farmer are high, or relatively higher than the cream prices. If prices of dairy products are relatively higher, more farmers produce cream, and milk more cows—it is easy to do this when beef animals are used, as they are present on the livestock farms; an example was the war-time boom, and appeal for dairy products—the butter production in Nebraska increased in 1943 from its "normal" of about 75 million pounds to nearly 95 million. Thus the economic climate of the present and the need for cash may affect the quantity of cream produced, and the number of producers. The changes to date, however, have not affected the *pattern* of cream production. It remains in the same general over-all region, "intensive" from the Canadian border southward through the northern third of Kansas (the regions within the 50 per cent isarithm) and with an outlier in western Oklahoma, and declines in intensity (as measured by the percentage of farms producing cream) southward and westward from the core.

Other changes are occurring also. Perhaps one of the most significant is the recent beginning of the manufacture of small quantities of sweet cream butter by some of the centralizers. The total is small to date, and this type of product dates only from 1951 in some of the plants. If this production continues and increases it will affect the Belt profoundly—from the methods of cream production, cooling, and storage on the farm, through farmer delivery to the cream station, through the whole pattern of cream stations, and the transportation methods and speed to the centralizer itself—the plant to date being based on the manufacture of butter from sour cream. Continued activity in this direction will re-orient the whole procurement situation, the procurement regions, and profoundly affect the present pattern in nearly all of its aspects.

SUMMARY

The centralizer has been an adjustment to the region of its dominant location—a region of extensive distances and limited cream production per unit of area, but large total production. Gathering of the cream from thousands of dispersed farms and ranches into hundreds of cream stations, and then "centralizing" the cream at huge urban manufacturing plants has been made possible through the existence of the

farm cream separator and of railroad and truck transportation. Large companies, equipped to handle bulk sales in distant markets, have evolved. Their existence and activity have in turn provided a market for the cream of additional farms and ranches, so that collectively a limited dairying economy is widely spread from the plains-border region throughout the Great Plains to the base of the Rockies, and from the Canadian border southward into Oklahoma to approximately the limits of cotton culture.

LABOR MOBILITY AND REGIONAL GROWTH

William H. Miernyk

Dr. Miernyk is associate professor of economics and director of the Bureau of Business and Economic Research at Northeastern University. *The field work for this paper, which was presented before the Association of Regional Scientists at Detroit, Michigan, December 28, 1954, was conducted in six New England textile centers between September, 1953, and March, 1954.*

A NUMBER of years ago Allen G. B. Fisher and Colin Clark called attention to the structural changes in employment which accompany the industrialization of underdeveloped economies.[1] The thesis developed by Clark and Fisher is that technological progress reduces labor requirements in the primary sector of the economy, thereby making available a larger proportion of the labor force to the secondary sector. Later, technological progress in the secondary sector permits an increasing proportion of the labor force to be employed in tertiary activities.[2]

More recently, Lewis H. Bean has pointed out that there is a close relationship between per capita incomes in various countries and the stage and pattern of industrialization.[3] Bean and others have also tried to explain the relative per capita incomes of regions in the same terms.[4] There is general agreement that incomes rise as dependence upon the primary sector is reduced. Clark and Bean argued, however, that incomes will rise still further as there is a progressive shift from the secondary to the tertiary sector. This conclusion was accepted by Hyson and Neal.[5] The core of this argument is that the successive shifting of the labor force from primary to secondary, and later to tertiary, occupations is the essence of economic development. Professor Seymour Harris, however, has questioned this. He has suggested that gains in tertiary employment "do not always reflect a rising standard of living, as Colin Clark claims, but frequently reflect a deterioration in manufacturing . . . ."[6] Professor Harris's position has been supported by Jean Fourastié, a French political scientist, who believes that a shift in the labor force from the secondary to the tertiary sector which is not induced by technological progress is evidence not of economic development but of economic retro-

[1] Allen, G. B. Fisher: *The Clash of Progress and Security*, London, 1935; Colin Clark: *The Conditions of Economic Progress*, London, 1940.

[2] The primary sector includes agricultural, pastoral, forest, fishing, and hunting industries. The secondary sector includes manufacturing, electric power production, mining, building, and construction. The tertiary industry is defined as all other economic activities. See Colin Clark: *The Economics of 1960*, London, 1942, p. 22n.

[3] Lewis H. Bean: "International Industrialization and Per Capita Income," Part V of *Studies in Income and Wealth*, National Bureau of Economic Research, 1946, p. 121. "By stage of industrialization is meant the proportion of a country's working population engaged in the primary occupations—agriculture, forestry, and fishing; by pattern of industrialization, the relative importance of secondary occupations—manufacturing, mining, and construction; and of tertiary occupations—trade and services." *loc. cit.*

[4] See Morris E. Garnsey: *America's New Frontier: The Mountain West*, New York, 1950, pp. 141–153; Charles D. Hyson and Alfred C. Neal: "New England's Economic Prospects," *Harvard Business Review*, Vol. 26, March, 1948, pp. 156–180; and Lewis H. Bean, *op. cit.*

[5] *Op. cit.*, p. 168.

[6] Seymour E. Harris: *The Economics of New England*, Harvard University Press, 1952, p. 286.

gression.[7] Fourastié's position is that a nation is not wealthy because it has a large tertiary sector; rather, it is the inverse. As the wealth of a nation increases it can afford to have a progressively larger proportion of its labor force engaged in trade and service activities. If the shift of the labor force from the secondary to the tertiary sector proceeds too rapidly, i.e., without a significant increase in productivity in the secondary sector, the result may be what Fourastié terms a "tertiary crisis." This he considers to be the case in France.[8] Similarly Professor Garnsey has pointed out that a region may have a larger proportion of its labor force engaged in tertiary activities than the nation and yet its per capita incomes may be below the national average.[9] Evidently, as Professor Harris has suggested, the progressive shifting of a region's labor force into the tertiary sector need not be an indicator of economic development.

One should emphasize that the shifts in the labor force discussed in the preceding paragraphs relate to the long-run; the same workers are not necessarily involved in the transition from one sector to another. In general, such changes have occurred slowly, and in large measure they represent the movement of succeeding generations of children into new occupations.[10] In those countries where new generations have not been bound by occupational traditions, the shifts have proceeded fairly smoothly.

It is necessary, however, to distinguish between such long-run *shifts* in the labor force and short-run labor *mobility*. By the latter we mean "changes of job, of employer, of occupation, of industry, of locality or region, and also changes of status, such as entrance to or exit from the labor market, and shifts from employment to unemployment or vice-versa,"[11] where all changes refer to a given worker or a given group of workers. The present paper is concerned with labor mobility and immobility in the short-run, and with their influence on long-run shifts in the labor force and regional economic development.

In the United States, as the regional economy of the South has shifted from dependence upon agriculture and other primary activities to increasing dependence upon manufacturing, labor has moved readily from the farm to the factory. Manufacturing establishments located in the South have offered unusually good employment opportunities to the children of southern farmers. And labor in the South has been available in abundance.[12] Even before the tempo of industrialization in the South was accelerated by World War II and its aftermath, technological progress in agriculture had reduced man-hour requirements, and the agricultural sector was characterized by chronic underemployment. When factories were located in southern rural communities they were swamped with job applicants. It is not uncommon even today for hun-

[7] Jean Fourastié: *le Grand Espoir du XX^e Siecle*, Presses Universitaires de France, Paris, 1950, pp. 92–93. A summary of Fourastié's ideas may be found in his *Esquisse D'Une Théories Générale de L'Évolution Économique Contemporaine*, Presses Universitaires de France, Paris, 1947.

[8] On this point, Colin Clark would evidently agree: "In France . . . there appears to have been almost a complete cessation of economic growth since the beginning of the present century. Until very recently at any rate this was certainly not attributable to unemployment." See *The Conditions of Economic Progress*, p. 148.

[9] *Op. cit.*, p. 146.

[10] Cf. Fisher, *op. cit.*, pp. 117–118.

[11] Gladys L. Palmer: *Labor Mobility in Six Cities*, Social Science Research Council, New York, 1954, pp. 4–5.

[12] See *Economy of the South*, Report of the Joint Committee on the Economic Report, U. S. Government Printing Office, Washington, 1949, pp. 4–5.

dreds of applicants to leave their names with the employment office of a new establishment which can hire at most one-tenth their number.

Southern workers seeking industrial employment are typically the younger members of the labor force.[13] Older workers who have spent a lifetime in agriculture may not readily make the transition to manufacturing industry, but their children make the transition easily.[14] Although many other factors must be considered in explaining the rapid industrialization of the South in recent years, one of the most important was the availability of a large pool of relatively young and adaptable workers. This, in turn, was the result of a high degree of long-run labor mobility between the primary and secondary sectors.

The situation is quite different, however, in an older industrial region such as New England. The industrial structure of New England has been changing in recent years. The precipitous decline in textile employment is well known, but this has been offset to some extent by the growth of durable goods industries in the region, and total manufacturing employment has not declined as much as textile employment.

There has been, however, an absolute as well as a relative decline in manufacturing employment in New England. The gains resulting from the expansion of new industries, notably electronics and apparel, have not been sufficient to offset the decline in textile employment. As a consequence there has been a long-run shift to tertiary occupations, but there has not been enough of a demand for labor in the trades and services to absorb new entrants into the labor force as well as the displaced textile workers, and as a result there is a relatively high level of chronic unemployment in the region which is concentrated for the most part in those areas hardest hit by the decline of textiles.[15]

[13] *Ibid.*, p. 5.

[14] Cf. Fisher, *op. cit.*, pp. 117–118.

CASE STUDIES OF DISPLACED WORKERS

Most discussions of the transition in New England have been based upon highly aggregated data, and have dealt with the changing pattern of industrial employment in the region from the long-run point of view. Although to a large extent the problems of short-run labor mobility have been avoided, some have simply assumed that workers displaced by the liquidation of textile mills are finding jobs in electronics factories, apparel shops, and other industries in which employment has been expanding in New England. To test this hypothesis, the present writer and others have made a series of case studies of the post-liquidation employment experience of displaced workers in some of the major textile areas of Massachusetts and Rhode Island.[16]

In all, six case studies were made, each consisting of a sample of workers who had been displaced by the liquidation of a textile mill in one of the communities listed in Table I.[17] The population in each case consisted of the workers employed in the mill during the last full quarter of operation. From payrolls completely random samples, stratified by sex, were selected. The size of the samples varied with the size

[15] Arthur A. Bright, Jr., and George H. Ellis (Eds.): *The Economic State of New England*, Report of the Committee of New England of the National Planning Association, Yale University Press, 1954, pp. 312–316.

[16] For the complete results see William H. Miernyk: *Inter-Industry Labor Mobility*, Northeastern University, Bureau of Business and Economic Research, Boston, 1955.

[17] In the Lowell case the mill had not been liquidated but had permanently curtailed its work force to about one-fourth the number employed before the downturn in textile employment started in New England in 1948.

TABLE I

WORKERS INCLUDED IN SURVEY BY LABOR MARKET AREA

	Interviews		*Mail Returns*		*Total*	
	Number	*Per Cent of Total in Each Case*	*Number*	*Per Cent of Total in Each Case*	*Number*	*Per Cent of Grand Total*
Lowell	205	88.4	38	15.6	243	14.3
Fall River	302	88.3	40	11.7	342	20.1
Lawrence	360	81.1	84	18.9	444	26.0
Non-Textile Areas	291	82.2	63	17.8	354	20.8
Providence	103	78.0	29	22.0	132	7.7
New Bedford	163	85.8	27	14.2	190	11.1
Total	1,424	....	281	....	1,705	100.0

Source: *Inter-Industry Labor Mobility*, p. 13.

TABLE II

AGE AND SEX DISTRIBUTION OF FORMER MILL WORKERS

	Interviews						*Mail Returns*						*Total*					
	Male		*Female*		*Total*		*Male*		*Female*		*Total*		*Male*		*Female*		*Total*	
	Number	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
24 and under	22	3.4	13	1.7	35	2.5	6	4.3	2	1.4	8	2.8	28	3.6	15	1.6	43	2.5
25–35	119	18.3	130	16.8	249	17.5	27	19.6	32	22.4	59	21.0	146	18.6	162	17.6	308	18.1
36–45	136	21.0	161	20.8	297	20.9	30	21.7	33	23.1	63	22.4	166	21.1	194	21.1	360	21.1
46–55	147	22.7	244	31.5	391	27.5	31	22.5	43	30.1	74	26.3	178	22.6	287	31.3	465	27.3
56–65	159	24.5	189	24.4	348	24.4	36	26.1	26	18.2	62	22.1	195	24.8	215	23.4	410	24.0
66 and over	65	10.0	34	4.4	99	7.0	6	4.3	5	3.5	11	3.9	71	9.0	39	4.2	110	6.5
Unknown	1	.2	4	.5	5	.4	2	1.4	2	1.4	4	1.4	3	.3	6	.7	9	.5
Total	649	100.0	775	100.0	1,424	100.0	138	100.0	143	100.0	281	100.0	787	100.0	918	100.0	1,705	100.0

Source: *Inter-Industry Labor Mobility*, p. 14.

of the mills. In some cases a 50 per cent sample was selected (where the mill was relatively small) and in others a 10 per cent sample was drawn. Where it was possible to do so the age and sex distribution of sample workers was compared with that of the population.

Following this, the addresses of the sample workers were plotted on large maps. Field interviewers then attempted to contact each member of the sample using lists prepared from the maps.[18] A standard interview schedule was employed, and in addition the interviewers attempted to elicit information about workers' attitudes which were recorded as nearly verbatim as possible. Those who could not be reached personally were sent a mail questionnaire similar to the interview schedule employed. The response to the mail survey was good. After the interviews and mail surveys were completed, frequency distributions of the two sets of samples were made to compare them with the populations in terms of age and sex distributions, the two control factors used (see Table II). In all cases the comparisons were close with no deviations larger than those

[18] The maps also gave some indication of the distances mill workers traveled to their jobs.

TABLE III

SUBSEQUENT EXPERIENCE OF FORMER MILL WORKERS

Employment Experience	*Male*		*Female*		*Total*	
	Number	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
Presently employed: one job since layoff	301	38.2	214	23.3	515	30.2
Presently employed: several jobs since layoff	153	19.4	110	12.0	263	15.4
Unemployed now, had job at one time	101	12.8	113	12.3	214	12.6
Unemployed since layoff	166	21.1	345	37.6	511	30.0
Withdrawn from labor force	66	8.4	136	14.8	202	11.8
Total	787	100.0	918	100.0	1,705	100.0

Source: *Inter-Industry Labor Mobility*, p. 17.

which could be explained by sampling variation. Hence, the interviews and mail surveys were combined for purposes of analyzing the post-liquidation experience of the sample workers.

The case approach would not have been appropriate if the cases analyzed were unique in some respect. Cases were not selected solely because information about the liquidated mills was readily available, but rather to obtain a good distribution of displaced textile workers geographically and over time. While we do not claim that the samples of workers studied are completely representative of all displaced textile workers in New England, there is a strong presumption at least that their experience is representative of a much larger group.

SUMMARY OF FINDINGS

The average displaced textile worker in New England is relatively old compared with the average worker in the Massachusetts civilian labor force. The modal age group for female workers in the civilian labor force is less than 24 years, and for males it is between 25 and 35 years. But the modal age group of female workers in our sample is between 46 and 55 years, and for males between 56 and 65. Only 2.5 per cent of the sample workers were 24 years of age or younger, while 17 per cent of the civilian labor force in Massachusetts consisted of workers in this age group.[12]

Subsequent Experience of Former Mill Workers.—Forty-six per cent of the sample workers contacted were employed when interviewed. A substantially larger proportion of men than women had found new jobs (Table III). Forty-three per cent of the sample workers contacted were unemployed, although about 13 per cent had been employed at some time since their original layoff. The remaining 12 per cent had withdrawn from the labor force with a larger proportion of women withdrawing than men.

The age distributions of employed and unemployed workers are compared in Figure 1. It is clearly evident that younger workers were more successful in finding new jobs than those, for example, past the age of 45. This is particularly true of the male members of the samples. It appears that the greatest barrier to re-employment of this group of displaced textile workers was their age.

Inter-Industry Labor Mobility.—Recent employment trends in selected Massachusetts industries, during the period covered by our survey, are given in Figure 2. It is apparent that the

[12] See, *Inter-Industry Labor Mobility*, p. 15.

drop in textile employment was much greater than the increase in employment in apparel and communication equipment. Nevertheless, the latter two industries were expanding. To what extent did the displaced textile workers find jobs in the expanding industries?

The distribution of employed sample workers by industries is given in Table IV. Despite the very substantial decline in textile employment, textile mills offered the best source of job opportunities to the displaced workers with more than 35 per cent of the employed sample workers once again at work in a textile mill.[20] It is interesting to note that only 6 per cent of the sample workers, almost all of them females, found jobs in the apparel industry. And only 7 per cent, again mostly women, were employed by the electrical machinery *industry group*. Since there are other industries than communications equipment in this group, it is highly probable that less than 7 per cent were employed by this growth industry.

After textiles, service occupations absorbed the largest number of displaced workers. Most service jobs were relatively low-paying and unskilled, and they include such occupations as chambermaids, janitors, porters, hospital attendants, nursemaids, etc. Most of the remaining workers found jobs in manufacturing establishments, and they were employed by a wide variety of industries as indicated in Table IV. Labor mobility and immobility are matters of degree, but given the employment trends in New England during the relevant period, the displaced textile workers exhibited a remarkably low degree of inter-industry mobility. We also found relatively little evidence of geographic mobility among the workers included in our survey.

An earlier study of the mobility of textile weavers lends support to these conclusions. Professor Gladys Palmer found that "the degree of mobility . . . is limited . . . in times of prosperity as well as depression."[21] And she concluded that the "relative immobility of weavers may be considered representative of that of most textile workers."[22] In a later study Carrie Glasser and Bernard N. Freedman concluded that "like the coal miners of Wales . . . and like many miners in this country during the great depression, textile workers show a strong attachment to their trades and their communities."[23]

Does this mean that textile workers are unable or unwilling to transfer to other industries or occupations? And are they unwilling to move to other areas where jobs might be more plentiful? The geographic immobility of our sample workers is undoubtedly a function of age rather than occupation. The average age of the sample workers was high, and many of them had spent a lifetime in the communities in which they had worked, or in nearby communities from which they could commute to their jobs. Geographic immobility is probably characteristic of older workers in general, and should not be considered as a unique attribute of textile workers. The willingness of workers to migrate tends to decline as they become older and feel bound to

[20] Even during a period of declining employment in an industry there are some job openings created by normal labor turnover. In addition, employment in all textile industries does not decline at the same time nor at the same rate. In some cases workers displaced by one textile industry were absorbed by another.

[21] Gladys L. Palmer: "The Mobility of Weavers in Three Textile Centers," *Quarterly Journal of Economics*, May, 1941, p. 486.

[22] *Ibid.*, p. 485.

[23] "Work and Wage Experience of Skilled Cotton-Textile Workers," *Monthly Labor Review*, Vol. 63, July, 1946, p. 13.

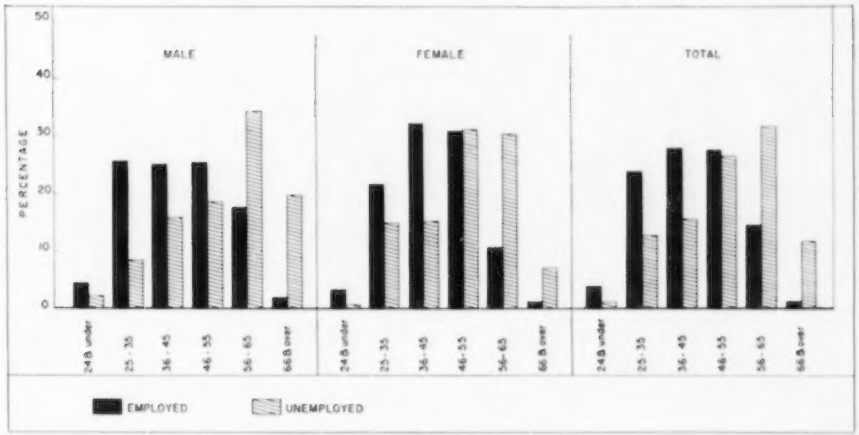


FIG. 1. Age distribution, by sex, of employed and unemployed workers. (Source: *Inter-Industry Labor Mobility*, p. 14.)

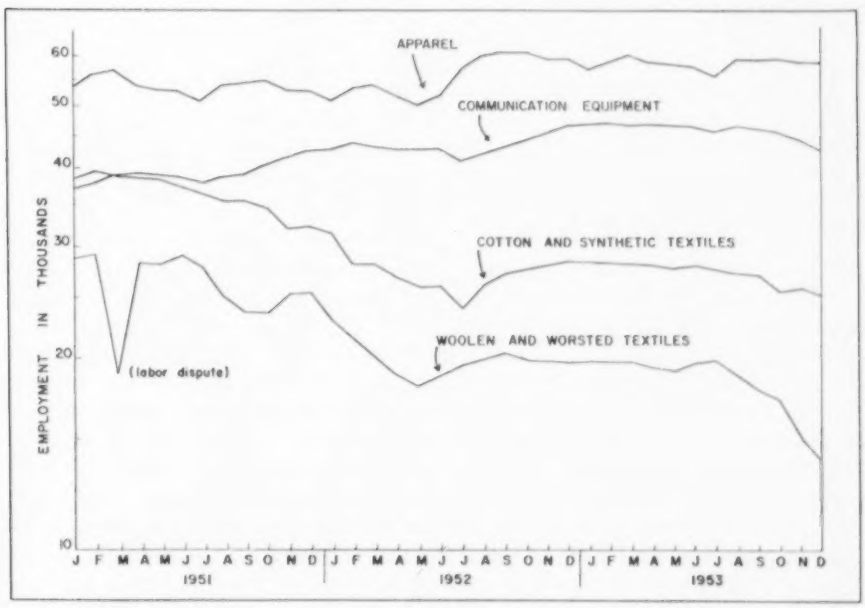


FIG. 2. Employment trends in selected Massachusetts industries, 1951–1953. (Source: *Inter-Industry Labor Mobility*. Data from U. S. Department of Labor, Bureau of Labor Statistics.)

TABLE IV

DISTRIBUTION OF EMPLOYED WORKERS BY INDUSTRY

	Male		*Female*		*Total*	
	Number	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
MANUFACTURING:						
Ordnance	3	.7	...	.....	3	.4
Food	12	2.6	5	1.5	17	2.2
Textiles	167	36.8	110	34.0	277	35.6
Apparel	4	.9	43	13.3	47	6.0
Rubber and products	12	2.6	8	2.5	20	2.6
Chemicals	11	2.4	5	1.5	16	2.1
Paper, etc.	13	2.9	9	2.8	22	2.8
Fabricated metals	12	2.6	2	.6	14	1.8
Non-electrical machinery	16	3.5	...	.....	16	2.1
Primary metals	1	.2	...	.....	1	.1
Electrical machinery	24	5.3	30	9.3	54	6.9
Leather and shoe	16	3.5	26	8.0	42	5.4
Printing and publishing	8	1.8	3	.9	11	1.4
Furnishings and Fixtures	8	1.8	1	.3	9	1.2
Transportation equipment	11	2.4	1	.3	12	1.5
Instruments (watches)	1	.2	1	.3	2	.3
Jewelry	5	1.1	6	1.9	11	1.4
Toys	2	.4	2	.6	4	.5
Lumber	1	.2	...	.....	1	.1
Photographic equipment	1	.2	...	.....	1	.1
Miscellaneous	1	.2	4	1.2	5	.6
NON-MANUFACTURING:						
Construction	21	4.6	...	.....	21	2.7
Service	65	14.3	53	16.4	118	15.2
Government	6	1.3	...	.....	6	.8
Armed forces	3	.7	...	.....	3	.4
Retail trade	19	4.2	13	4.0	32	4.1
Warehousing	2	.4	...	.....	2	.3
Miscellaneous	9	2.0	1	.3	10	1.3
Unknown	...	.....	1	.3	1	.1
Total	454	100.0	324	100.0	778	100.0

Source: *Inter-Industry Labor Mobility*, p. 19.

their communities by ties of friendship, membership in organizations, and similar non-economic influences. But the lack of inter-industry mobility does not appear to be the result of unwillingness or inability to move to other industries or occupations. Studies of the *voluntary* movement of workers among jobs and occupations have demonstrated that "the amount of voluntary movement has been, *without question*, primarily dependent upon the existence of job opportunity."[24] One may assert with equal confidence that had job opportunities existed a much larger proportion of the displaced textile workers would have been employed in other industries. Because of their age the only jobs available to many of them were in other textile mills. It is true that a majority of the workers who found non-textile jobs indicated a preference for textile employment, but this is largely explained by the higher wages and better working conditions they had enjoyed in the mills.[25]

[24] George P. Shultz: "Recent Research on Labor Mobility," reprinted from *Proceedings of the Fourth Annual Meeting, Industrial Relations Research Association*, as M.I.T. Publications in Social Science, Series 2, No. 34, p. 1. See also Lloyd G. Reynolds: *The Structure of Labor Markets*, New York, 1951, p. 32.

[25] There was a substantial decline in earnings between old and new jobs, and a downgrading in skill classifications. For example, while 12 per cent of the sample workers reported no significant change in earnings and 21 per cent reported higher earnings, 64 per cent were earning less in their new jobs than they had prior to their displacement. Some of those who were earning less were still employed in textiles, but in lower skill classifications.

SIGNIFICANCE FOR REGIONAL DEVELOPMENT

What is the significance of these findings as far as long-run regional development is concerned? There is little question about the long-run mobility of labor either within or between sectors. But our survey, which is supported by several earlier studies, suggests that there is considerable immobility in the short-run; that displaced industrial workers do not readily transfer to new industries largely because of the absence of job opportunity,[26] and that older workers in particular do not exhibit a high degree of geographic mobility. As a consequence, the migration of labor-oriented industries from an older industrial region, such as New England, to regions which are now industrializing might result in a transfer of underemployment from the latter to the former.

We should distinguish clearly between the relative decline in the secondary sector of our national economy which is the result of technological progress and a consequent reduction in man-hour requirements, and a relative decline in the secondary sector of a regional economy which is the result of inter-regional competition. In the former case total output has risen as labor has been shifted into the tertiary sector. More efficient machinery has permitted us to turn out more goods with less human effort, and workers have been released to provide us with more services. All this has led to a steadily rising national income.

In the regional case, however, the results might be entirely different. To the extent that the relative decline in the secondary sector is due to technological progress the results are no different from those discussed above. But if, in addition, the relative decline is partly due to the inability of manufacturing employers to compete with those in other regions, unemployment in the region will rise. Because of the short-run immobility of manufacturing workers this unemployment may persist even when there is "full" employment in the nation as a whole.[27] This in turn will tend to depress wages not only in the secondary sector, but also in the tertiary sector where employers are faced with less competition from manufacturing industry for new entrants into the labor force.[28] Where this occurs, a region may experience a relative decline in its income position.[29]

As wages in such a region fall, in relation to national wage levels, there may well be expansion of employment in both the secondary and tertiary sectors, although not necessarily enough to approach an optimum utilization of the region's labor force. The expansion of employment in some industries while employment in other industries is declining, we should repeat, is primarily a long-run shift in the labor force and is not evidence of a high degree of short-run mobility.

The present paper has been primarily concerned with a particular occupa-

[26] A further contributing factor to labor immobility is a lack of information about labor market conditions. See Lloyd G. Reynolds, *op. cit.*, pp. 84–85; and George P. Shultz, *op. cit.*, pp. 5–6.

[27] See William H. Miernyk: *Chronic Unemployment in New England from 1947 to 1951*, Committee of New England of the National Planning Association, Staff Memorandum Number 2, Boston, May, 1952.

[28] For a discussion of New England's relative wage position see *Wage Differentials and Rate Structures Among 40 Labor Markets*, U. S. Department of Labor, Bureau of Labor Statistics, Bulletin No. 1135, April, 1953.

[29] The argument that New England has maintained its income position in spite of a decline in manufacturing employment is not convincing. It is true that the *absolute* difference between regional and national per capita incomes has remained nearly constant, but the *relative* difference between the two has diminished.

tional group in a given region. But the conclusions are not equally restricted. In a dynamic economy there will always be some shifting about of industry.[30] Other regions are now beginning to experience some of the transitional problems New England has been faced with for some time. If regional development is to proceed smoothly these problems must be minimized.

To date, the operation of the labor market has received scant attention from regional scientists and others concerned with regional development. In part this is due to the emphasis on long-run change, and a preoccupation with the development of backward regions and areas. But in the United States at least the problems of structural change in older industrial regions should command greater attention in the future.

There is some evidence that positive efforts to encourage short-run labor mobility can smooth the adjustment to structural change. Some communities have initiated programs, involving the cooperative efforts of state divisions of employment security and industrial development agencies, to retrain displaced workers and place them in new jobs.[31] While no one has yet come up with a panacea for all the problems engendered by structural changes in employment, positive programs to encourage labor mobility have demonstrated that the short-run problems can be mitigated. At least they offer something more tangible than the vague and often illusory hope that displaced workers will on their own be able to find jobs by shifting to new industries or occupations.

[30] The long-run trends described by Clark and Fisher will also continue and probably will be accelerated by recent developments in the automatization of manufacturing industry.

[31] For further details see *Inter-Industry Labor Mobility*, pp. 145–149.

THE SOUTHERN ANTHRACITE REGION A PROBLEM AREA*

E. Willard Miller

Dr. Miller, head of the Department of Geography, The Pennsylvania State University, has contributed a number of previous articles dealing with the geography of mineral production.

THE anthracite fields of Pennsylvania have long been recognized as one of the significant mining areas of the world. But for more than three decades this area has been plagued by unemployment, indicating that the region is undergoing structural changes to which it has been unable to adjust. A solution to the difficulties is imperative, since the lives of hundreds of thousands of people in a highly industrialized part of the United States are affected. The problem of the anthracite region is not merely a local one; rather, it is a localized national problem. In a period of high country-wide employment levels, the anthracite counties stand out as an area of chronic economic maladjustment.

Since there are significant contrasts between the northern and southern anthracite regions in historical development, anthracite reserves, type of mining, and industrial trends, this discussion is limited to an analysis of the economy of the Southern Anthracite Region. This area coincides with the Southern and Western Middle Fields, which stretch in a northeast—southwest direction from the Lehigh River to the Susquehanna—a distance of 70 miles. In few places is the region more than 25 miles wide.

*The writer wishes to express his appreciation for aid granted by the College of Mineral Industries of The Pennsylvania State University for field work and for valuable cartographic assistance from Robert Chilcote and William Stockdale, research graduate assistants.

The Mining Economy

The production of anthracite in the Southern Anthracite Region can be clearly divided into two distinct periods: the period of expanding production from 1820 to 1918, and the period of declining production from 1918 to the present (Fig. 1).

Period of Expanding Production, 1820–1918

At the time anthracite was first shipped from the Southern Anthracite Region, about 1820, the area was essentially an uninhabited, rugged, forested wilderness. In the next century a major mining economy developed that dominated all economic life. There are only a few cases in the mining world where a region has maintained for so long a period such a strong, upward trend in its productivity curve. This was possible because of the great reserves and because, for more than a hundred years, anthracite was considered the perfect home heating fuel. Until at least 1880 it was a major industrial fuel, too. The number of customers grew far faster than the region's population, and little wonder. This was a fuel that yielded intense heat without smoke. It did not form tarry masses in the fire box. It maintained an even heat with a

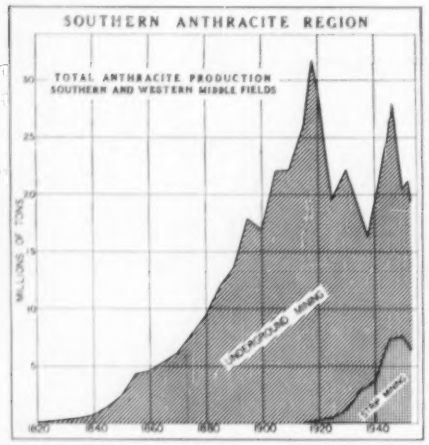


FIG. 1. Production of anthracite in Southern Anthracite Region, 1820–1952. Note the reversal in upward trend since 1918.

natural draft. With reasonable skill, a fire once lighted in the autumn might be kept burning during the entire winter. No such conveniences as these were offered by any other fuels of the day.

The economy and population of the region grew as the markets for anthracite expanded. In the initial stages, between 1820 and 1850, production increased rather slowly. But, by 1850, a major mining industry had come into existence and the region's population exceeded 75,000 (Fig. 2). After 1850, the market for anthracite expanded greatly resulting in a significant areal extension of anthracite mining. By the early 1880's anthracite was being produced throughout the Southern and Western Middle Fields (Figs. 3 and 4). Consequently, the pattern of exploitation has changed little in the last three quarters of a century (Figs. 5 and 12).

As a result of the spectacular growth of the mining industry, the anthracite mining landscape developed. Mining towns such as Port Carbon, Coaldale, Centralia, Shenandoah, Minersville, Shamokin, Mt. Carmel, and several scores of others came into existence;

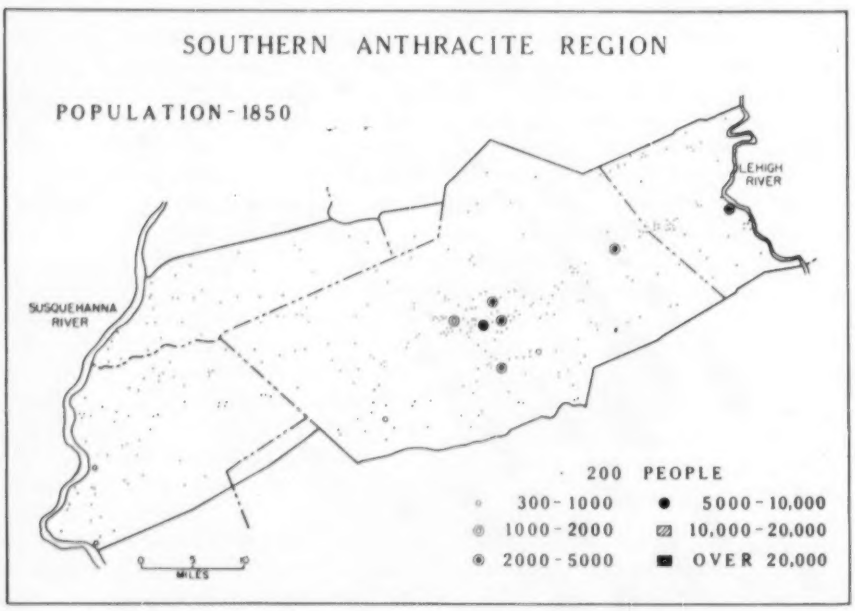
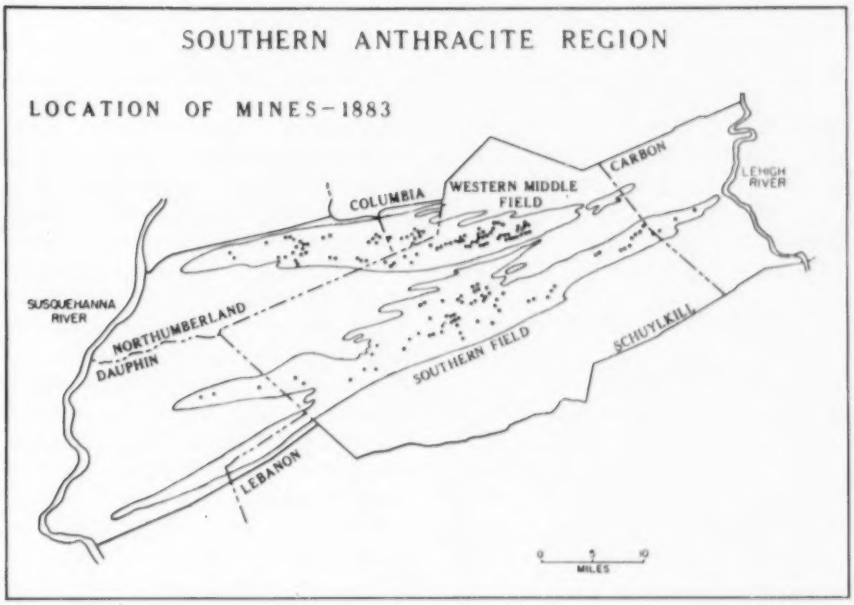


FIG. 2. In 1850 a mining economy was developing rapidly in the Pottsville area.



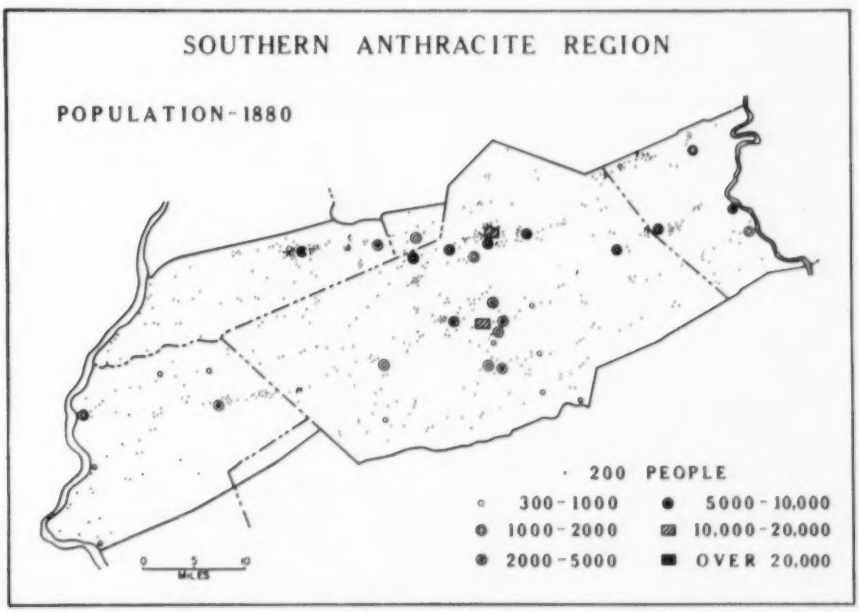


FIG. 3. By 1883 exploitation was well advanced and the productive pattern of the fields essentially established.

FIG. 4. A dense urban settlement pattern had developed by 1880, indicating the advanced stage of the mineral economy.

and the well known anthracite landscape evolved, consisting of collieries, mammoth piles of waste, congested valley towns almost invariably poorly constructed, and the ever-present railroad. The last of these elements was particularly important, since almost all of the anthracite was consumed outside the region. Here was an area dedicated to the exploitation of a useful mineral.

Period of Declining Production, 1918 to Present

The reversal of the upward trend in mining since the early 1920's has had a disastrous effect on the economy of the Southern Anthracite Region. Production declined steadily from a peak of 31,750,000 tons in 1918 to a low of 16,433,000 tons in 1938 (Fig. 1). With the increased needs of fuel in World War II, output climbed to a second peak of 27,897,000 tons in 1946, but has steadily declined in the postwar period to a low of 21,129,000 tons by 1952. While the decrease in anthracite production has been significant, there has been an even more drastic decline in employment. The number of miners in the Southern Anthracite Region has decreased from a peak of 64,950 in 1922 to a low of 22,790 by 1953 (Fig. 6).

The decrease in job opportunities in anthracite mining is due not only to a decline in output but also to the widespread introduction of more efficient methods, particularly strip mining since about 1930. In recent years nearly 40 per cent of production in the Southern and Middle Western Fields has been from surface operations (Fig. 1). Because of the abundance of surface seams, this area accounts for about 80 per cent of all stripped coal produced in the Pennsylvania anthracite fields. The average tons mined per man per day in 1952 by underground mining was 3.06, by strip mining, about 8. There-

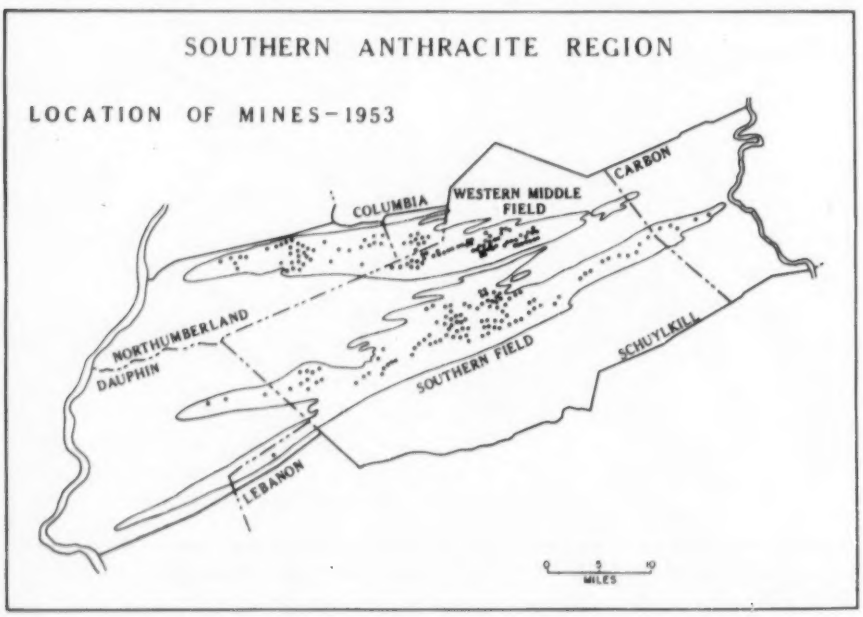


FIG. 5. The distribution pattern of anthracite mines in 1953 is much the same as that of 1883.

fore, though strip mining has helped maintain anthracite production it has not prevented a drastic downward trend in employment in the anthracite industry.[1]

To complicate the economic plight of declining total employment, there has also developed the problem of underemployment for those who have remained in the industry. Since 1930 the average work year for the miner has varied from as low as 162 work days in the depth of the 1930's depression to a high of 292 work days during World War II. In the postwar period the average anthracite miner has worked from 30 to 50 fewer days each year than the man employed in manufacturing in Pennsylvania. This situation is further aggravated by the small number of hours in the average work week. Since 1949 the work week has averaged only 30 and 32 hours.

During the past 30 years, many reasons have been offered to explain the decline of the anthracite industry. Of these, the factor of reserve depletion has often been suggested, since anthracite is a non-renewable resource. However, as a result of recent surveys of anthracite reserves, it is clear that there is no basic problem in reserves in the Southern Anthracite Region. As of January 1, 1945, the reserves of the Southern Field were estimated at 9,572,000,000 tons, sufficient to last at present mining rates for more than 600 years. At the same time, reserves in the Western Middle Field were estimated to be 3,561,000,000 tons sufficient at present mining operations for nearly 200 years.[2] Approximately 80 per cent

[1] In 1953, anthracite mining in the Southern Anthracite Region employed 22,790 men of whom approximately 4700 were engaged in strip mining operations.

[2] George H. Ashley: "Anthracite Reserves," Pennsylvania Topographic and Geological Survey, Progress Report 130, Harrisburg, 1945.

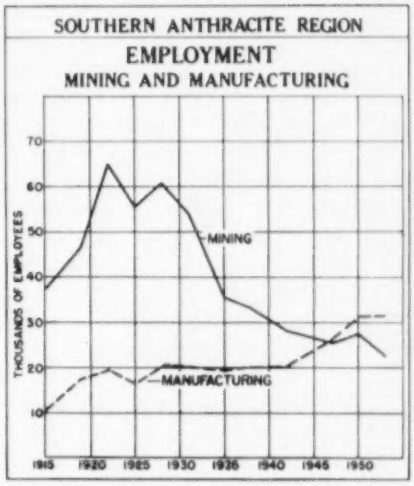


FIG. 6. Manufacturing employment now is substantially greater than mining employment in the Southern Anthracite Region.

of the remaining coal reserves of the entire anthracite fields are in the Southern and Middle Western Fields.

Though the long range situation in regard to coal reserves is excellent, there is a problem of local depletion of reserves at present mining sites. The short run effect of the depletion of a particular mine can be serious locally, because of the effect which it has upon property values and employment. Consequently, there may be unemployment and financial distress in a particular mining district, and at the same time a shortage of labor in an adjoining community. Because underground mines are long lived, costly to develop, and normally a settlement has developed around their operations, the mining industry lacks local mobility. However, although there may be a depletion of reserves locally, other factors must be sought to explain the general declining production curve.

The difficulties of the industry also have been attributed to increasingly complex mining problems. Since this

is an old mining area and since many of the more accessible anthracite seams are gone, there is little doubt that underground mining is becoming more difficult. However, a generally rising curve of production per man indicates that these technical problems are being solved. In 1890 the average tons mined per man per day in underground operation was 1.85; in 1952 it had risen to 3.06 tons.

Since the reserve position is still strong and basic mining problems are being solved by technical advances, the decline in production must be attributed to other factors. Because anthracite is traditionally a home heating fuel and has had the greatest loss in this market, it has been claimed that anthracite has been priced so high that it cannot compete with other fuels.[3] This would appear to be only a partially correct statement applying to competition with other fuels in a specific area.

In a comparison per ton costs of production of anthracite and bituminous coal for the years 1943 through 1946, compiled by the Office of Price Administration, it is revealed that production costs for anthracite per unit of heat were more than twice those for bituminous coal mined in the Appalachian coal fields.[4] Although production costs have increased in both branches of the coal industry since 1946, there is no indication that there is a closing of the gap between them. This price relationship between anthracite and bituminous coal has long been in existence so that anthracite has always been handicapped in areas served by the bituminous fields of eastern United States.

The traditional market area of anthracite has, thus, been eastern Pennsylvania, New Jersey, New York, New England, and eastern Canada, where transportation costs raise the price of bituminous coal to approximately that of anthracite. However, on the Atlantic coast, anthracite, as a home heating fuel, has had growing competition from fuel oil. In 1920 anthracite supplied more than 95 per cent of the home heating needs of this area. Since this date anthracite's position has continually declined so that by 1952 fuel oil supplied 66 per cent, anthracite 32 per cent, and coke and briquettes 2 per cent of the home heating fuel needs. Between 1940 and 1950 the absolute decrease in the number of dwelling units in northeastern United States reporting the use of anthracite as a heating fuel amounted to 1,628,410. The loss of market for anthracite from this source alone would amount to well over 11,000,000 tons.

The question immediately arises as to whether this loss of market in the traditional anthracite marketing area is due to a price differential with competing fuels. As shown in Table I for selected eastern cities, the price of anthracite for most grades is considerably lower than that of fuel oil for an equal quantity of heat. Thus, the change to competing fuels has not been on the basis of the competing fuels selling for lower amounts in this normally anthracite market area. Where cost differentials against anthracite have existed, they have been slight and only for selected sizes.

Though price is at most a minor factor in the declining home market, there appear to be two principal causes of major significance encouraging the change in consumption from solid to

[3] In 1920 over 80 per cent of anthracite production was consumed by home heating. This proportion had declined to about 50 per cent by 1952.

[4] 1943 anthracite costs per ton were $5.27 against $2.49 for bituminous coal; in 1946 the same trend continued with costs of $6.71 and $3.28 respectively.

liquid fuels. First is convenience in the use of fuel oils; second are the psychological drives that have gradually developed during the past several decades. The trend toward the use of more and more labor saving devices in the household is of the greatest importance. The American home can now be heated through no more effort than the delicate adjustment of a thermostat. The anthracite industry, largely through the Anthracite Institute, has attempted to provide a somewhat similar convenience by developing and promoting automatic stokers. However, the number of stokers purchased indicates that they are not a significant factor in maintaining the anthracite market. Though they represent a definite step forward, anthracite still must be shoveled from the coal bin into the stoker.

The psychological factors, though elusive, are no less real. The use of anthracite is no longer regarded as fashionable. It has become an outmoded fuel. Labor difficulties resulting in strikes have frequently given the impression that a supply of anthracite might not be available during the cold winter months. While the supply of anthracite above ground is normally sufficient to take care of demands for many months, this is not appreciated by the general public. Thus, there has been frequently an abandonment of the use of anthracite through unwarranted fears.

Besides the decline of the home heating market for anthracite, a number of the minor markets have also decreased. The use of anthracite as a railroad fuel has dropped by more than 50 per cent since 1940. This is the result of several factors, all of which have been negative. Bituminous coal and fuel oil have largely replaced anthracite, even invading the anthracite region. This situation has been aggravated by the reduction in amount of anthracite hauled by the railroads, resulting partly from the total decrease in consumption but accentuated by the inroads of the trucking industry.

In the past, the anthracite industry itself used large amounts of coal, but this has gradually changed. The anthracite consumed by the mines for heat and power consisted of the least saleable, lowest cost sizes. This low quality anthracite was used with a

TABLE I

PRICE OF ANTHRACITE (CHESTNUT, STOVE, PEA, BUCKWHEAT NO. 1), FUEL OIL NO. 2, AND GAS CONSUMED IN SELECTED CITIES OF EASTERN UNITED STATES

(Based on heat equivalent in one ton of pea coal,* March 15, 1952)

Fuel	*Philadelphia*	*New York*	*Boston*	*Baltimore*	*Washington*	*Buffalo*
ANTHRACITE						
Stove	.....	.....	25.18	22.17	22.95	.....
Chestnut	22.32	25.00	25.42	22.42	23.11	24.11
Pea	18.82	19.90	22.09	19.33	.....	.....
Buckwheat No. 1	15.25	16.00	18.22	15.92	16.30	16.99
FUEL OIL NO. 2	22.55	23.49	23.28	22.99	23.75	25.95
GAS						
Manufacturing Gas	.....	54.50	65.07	.....	.....	.....
Natural Gas	.....	58.74	.....	37.73	32.97	.....
Mixed Gas	43.30	.....	.....	.....	.....	23.29

Source: U. S. Bureau of Labor Statistics, Retail Prices and Indexes of Gas, Electricity, and Residential Heating Fuels March 15, 1952, Washington, 1952.

*Conversion factors (except for stove coal) are adopted from Pennsylvania Department of Commerce, State Planning Board: "Pennsylvania Anthracite," Harrisburg, 1952, page 12.

complete absence of transportation costs or dealer margins, and with little or no preparation. In recent years there has been a shift from the direct use of anthracite for power needs to purchased electricity. Since the electric utilities in the region are large users of anthracite, part of the decrease in mine consumption has been reflected in the increase in electric utility consumption. Taken as a proportion of anthracite output, the collieries consumed about 11.5 per cent of production from 1910 to 1922. Since then there has been a steady decline, so that in 1952 only 2.5 per cent was used as colliery fuel.

Although anthracite has experienced an absolute decline in consumption in its major markets, several of the minor markets have grown in recent years. Of the total anthracite consumed the proportion used in manufacturing has increased from about 10 per cent in 1939 to nearly 20 per cent in 1952. Among industrial consumers, paper and allied products stood first, followed by chemical and allied products, primary metal industries, food and kindred products, and textiles. The concentration of anthracite used in certain industries and the general distribution of this use by industry are largely conditioned by geographical location. Because of the uniform heating quality of anthracite, a relative preference for this fuel is shown by certain industries in areas where it can compete favorably with other fuels. Anthracite is also favored by industry over bituminous coal in those communities that have passed anti-smoke ordinances.

The use of anthracite by electric utilities has also shown a strong upward trend since 1920. Total consumption has risen from 1,540,302 tons in 1920 to 3,761,902 tons in 1952. Of the latter amount, about 95 per cent was consumed in eastern Pennsylvania. Since the total anthracite market has declined, the relative importance of anthracite consumed by electric utilities has increased considerably. In 1952 they accounted for 9 per cent of total consumption. While the amount of anthracite used by the electric utilities has climbed sharply, anthracite's relative position, when compared with other fuels burned in the generation of electricity, has declined, as has also been the case with bituminous coal. On the other hand, oil and gas have been consumed in increasingly larger proportions. The increased efficiency of anthracite consumption by electric utilities over the past decade has caused its use to increase at a slower rate than the amount of electricity generated from anthracite.

A certain proportion of anthracite production has also been exported for many years. However, the amount of such tonnage has been variable and influenced by a number of changing factors. The late 1930's saw the beginning of a period of increased anthracite export activity which culminated in 1947. Export activity in those years was based largely on the inability of English coal producers to supply the Canadian market with customary amounts of bituminous coal, and to deficiencies of supply in Western Europe because of low coal output there. However, in recent years anthracite exports have fallen, and there is little hope that the export trade will aid significantly in bringing stability to the anthracite industry.

There have also been many attempts to find new uses for anthracite. Some of these appear promising. Among them are metallurgical uses of anthracite fines, anthracite fines in gas generation, fuel briquettes, activated carbon from anthracite culm and silt piles, and anthracite use for drying crops

such as tobacco. Though these new uses have been of little importance in maintaining production thus far, an enlarged research program in developing new uses for anthracite could pay high dividends.

THE MANUFACTURING ECONOMY

With the decline of anthracite employment, there have been attempts to bolster the economy of the region by introduction of other economic activities (Fig. 9). This trend has gained impetus particularly in the postwar period. As a result employment in manufacturing has grown from a little over 10,000, in 1915, to over 31,000 in 1953 (Fig. 6). However, employment in manufacturing did not exceed that of mining until 1947. With this growth there has been a striking development of one-industry towns (Fig. 8) with an increasing dominance of the textile and apparel industries which in 1953 employed about 68 per cent of all workers in manufacturing (Figs. 7 and 9). Unfortunately for the development of a prosperous economy, about two-thirds of all the workers in manufacturing in the Southern Anthracite Region are women, so that manufacturing is best characterized as one of low value added and, consequently, low wages.

All other manufacturing industries are small and have played a relatively insignificant role in establishing a sound economy (Fig. 7). Of the lesser manufacturing industries the metal products establishments are most important, with about 11 per cent of the total employment in 1953. Other manufacturing of some importance includes leather products, primarily footwear, 6 per cent of employment; food and kindred products, 5 per cent; and chemical and allied products, 3 per cent.

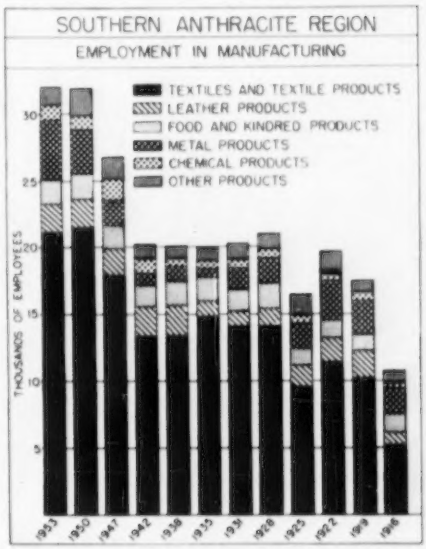
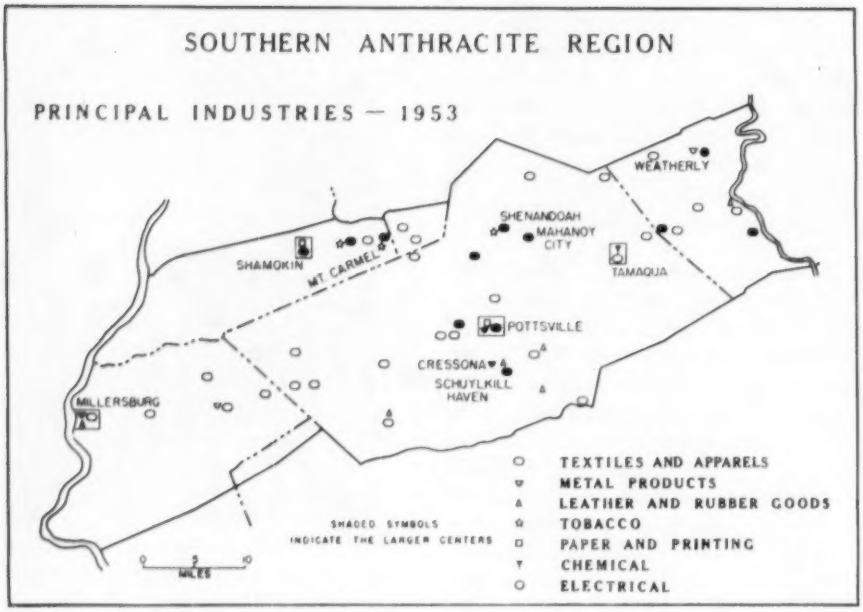


FIG. 7. Types of manufacturing by employment in the Southern Anthracite Region, 1915–1953. The growing dominance of the textile and textile products industries is strikingly shown.

Textile and Apparel Industries

The textile and apparel industries have long been second only to coal mining as a source of employment in the Southern Anthracite Region (Fig. 10). While anthracite employment has been declining, the textile and apparel industries have had a generally steady rise, with minor cyclical retardations. Total employment in these industries rose from 5300 in 1916 to slightly over 21,000 in 1953 (Fig. 7). A major rise in employment in the apparel industries has occurred since World War II, accounting for much of the total increase of employment in manufacturing in the Southern Anthracite Region since 1946 (Fig. 10).

The structure of the textile and apparel industries has undergone considerable change in the past 30 years. Until about 1925, textile production, principally knit goods, silk, and rayon,



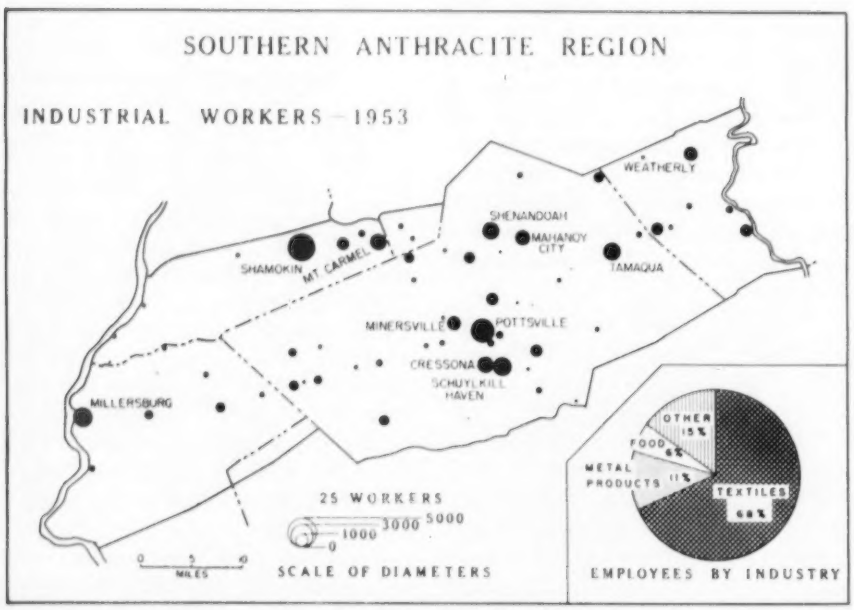


FIG. 8. Distributional pattern of the principal manufacturing industries in 1953. Notice the importance of one-industry towns.

FIG. 9. Distribution pattern of employment in manufacturing industries in 1953.

dominated this industry. The early localization of these types of textiles in the Southern Anthracite Region can be basically explained in terms of a number of favorable cost differentials. With the appearance of more automatic textile machinery about 1880, it was possible to localize the industry in areas of abundant, unskilled labor. Nowhere in the United States was there a greater availability of cheap female and child labor than in the anthracite settlements. This element, together with temporary tax exemptions for mills provided by the coal companies, was the primary factor in attracting and facilitating growth of the textile industry.

However, since the middle of the 1920's there has been a gradual but fairly steady decline of the importance of the textile industry and a rather remarkable growth of the apparels industry (Fig. 10). The lack of expansion in the textile industry is most directly attributable to a growing disadvantage in labor costs resulting in extreme competition from other sections of the country. The growth of unionism and government regulations during the past several decades have served to raise wage and salary payments and reduce hours of work. In 1929 the average yearly wage and salary payment per textile worker was only $891.00 for the Southern Anthracite Region, in comparison with $1697.00 in 1949. The strength of the unions in the anthracite industry has undoubtedly been a factor in promoting unionization among the textile workers.

The textile industry has thus migrated to areas which offer lower labor costs. Since wage rates are relatively lower in the Piedmont of the South, it is that region which offers the severest competition to mills located in the anthracite region. In 1950 the average hourly wage ranged from $1.49 to $1.62

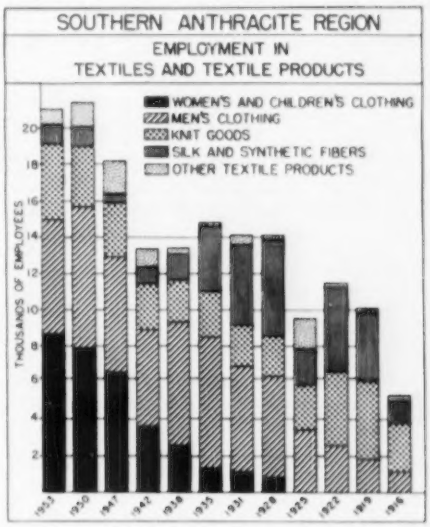


FIG. 10. Types of textiles and textile products, 1915–1953. The growing importance of apparel production is the most striking trend in these industries.

in the anthracite region, while those in the South ranged from $1.48 to $1.56. In addition, paid holidays are generally more liberal in the North than in the South.

The wage differential between North and South is, thus, not difficult to perceive. A southern mill operator, in order to attract labor, must pay as high a wage as can be earned in alternative employment. Agricultural pursuits constitute the primary source of employment opportunities in that region. Income from southern farms is low, and textile mills need only to pay a wage equal to or slightly higher than that which can be earned from farm work. In addition to lower pay of labor in alternative employment in the South, the extent of unionization also has an important bearing on wage rates. Since industrialization has proceeded at a slower pace in the South, labor unions are not only less numerous but also less influential. The southern mill operator,

therefore, has a greater advantage in determining the terms of the wage bargain.

Although textile mills have succumbed to the financial attractions of the South, the apparel industries of the Southern Anthracite Region have not. On the contrary, the apparel industry has grown from a few over a 1000 workers in 1916 to nearly 15,000 in 1953 (Fig. 10). The major factor in this growth would appear to be that proximity to the major consuming centers exerts a stronger influence on location than does the alternative of a cheaper labor supply or possibly lower taxes. So important is the style factor in clothing that a manufacturer cannot locate too far from his market. Of course, this area does not specialize in high-fashioned women's clothing. The influence of style change is so predominant in that branch of the apparel industry that it is almost exclusively located in a few centers such as New York City and Los Angeles. In contrast, the anthracite region, lying beyond the immediate influence of New York, has tended toward mass produced merchandise in which the style element is less important than the price element. Consequently, there has been an emphasis placed on production of men's and children's clothing.

Though there has been a rising employment curve in the apparel industry, it has not been free of problems. The firms of the garment industry have exhibited a high degree of mobility. As a typical example, between 1935 and 1953 there were 56 firms that manufactured shirts in the Southern Anthracite Region. At no time were there more than 32 firms in existence, and in 1953 only 15 firms produced shirts. Only five firms were in existence during the entire period between 1935 and 1953. The average life of a shirt factory was approximately four years.

A number of factors have contributed to this lack of stability. Most important is the small size of the individual plant and, consequently, small capital investment. This has resulted in an intense specialization by factory on a particular type of garment. Also, within the area, few textile firms cut and manufacture ready to wear clothing. Nor are apparel manufacturers generally integrated backwards, producing and finishing their own fabrics. This specialization in a particular line of garments is a predominant factor in keeping the typical enterprise small.

Equally important is the fact that cutting tables, sewing machinery, and auxiliary equipment are relatively inexpensive and require little space for operation. Often an entire plant, completely equipped, is rented by a manufacturer. This has encouraged the entry of many firms into an area where failures are commonplace. On the failure of one company, a new organization can come into existence with practically no capital investment.

Although this makes entry into the garment industry easy, certain problems are created. Neither the trade name of the product nor marketing channels are well established within a short period of time. Unfortunately, under these conditions firms are able to survive only during periods of rising demands. With the slightest cyclical downtrend, the company having little capital or reputation is likely to fail. Thus, the industry tends to expand rapidly during periods of rising business activity, but during periods of declining business activity plant capacity does not contract sufficiently to enable most companies to operate profitably. A still further adverse affect of this instability is shown in the lack of new factory buildings.

Most of the textile and apparel factories in the Southern Anthracite Region are antiquated, having been built before 1900. Likewise much of the equipment is obsolete which decreases the efficiency of the labor force.

Since the apparel industry operates on a minimum margin of profit, it is necessary, in order to secure the lowest possible production cost, to utilize female labor. Since work in the apparel industry is both seasonal and cyclical, there is always a high rate of unemployment among women workers. Unemployed workers, however, do not leave the industry for alternative employment opportunities are usually not available. There is, thus, always a large surplus labor supply available for the garment companies to utilize as seasonal or cyclical increases expand production to peak levels.

The predominant position of the textile and apparel industry in the manufacturing economy of this area has not greatly aided in providing positions for the increasing number of unemployed miners. The textile and apparel industry based on a low cost labor supply remains today, as throughout the past century, a parasitic industry depending for its employees on the wives and daughters of coal miners. This industry will not bring economic stability to the anthracite region.

Metal Products Industries

While the metal fabrication industries are the second most important type of manufacturing in the Southern Anthracite Region, they are far below the textile and apparel industries as a source of employment (Fig. 7). Though every town would prefer increased employment in the metal products industries, the growth of these industries has not been as significant as in the textile and apparel industries. But, whereas the metal products industries have only 11 per cent of manufacturing employment in the Southern Anthracite Region in 1953, they produced about 27 per cent of the total value added by manufacturing.

In contrast to the textile and apparel industries, which are widely dispersed, the important metal fabrication industries are concentrated in a few cities (Fig. 8). The Pottsville district is most important, with approximately 75 per cent of the workers in the metal fabrication industries of the region. Other important centers include Waverly and Millersburg, which lie outside the coal producing fields. Within the Western Middle Field, the metal products industries have had only a minor development.

Sometimes the Southern Anthracite Region is considered to be characterized by small establishments. This is largely true in the textile and apparel industries, but in the metal fabricating field large plants dominate. In 1953 the three largest plants in the region employed 72 per cent of the workers in the metal fabrication industries. In recent years the expansion in employment has been due to the entrance of a few large plants, such as the Aluminum Company of America's plant at Cressona which employs more than 1200 persons. With a gradual growth of the metal products industries by the entrance of small plants it would require years to increase employment as much as results in a short time from the entry of one or two large establishments. This is a type of industry where increase of employment through entry of large plants requiring a minimum proportion of highly skilled labor is eminently desirable and apparently feasible.

Also, contrasted with the textile and apparel industries, which employ predominately female workers, the metal

fabrication industries employ a large percentage of male workers. There is, however, a general recognition that a shortage of skilled workers exists for the metal products industries, although there is a readily available supply of semiskilled and unskilled workers. While this is generally not considered a major impediment to the continued operation of present plants, it is viewed as an obstacle to general expansion and entry of new plants. The problem of developing and maintaining a body of skilled labor is directly related to low wage levels. Except at the machine tool center at Millersburg, the most highly skilled workers are leaving the area to go to such near-by prosperous industrial centers as Philadelphia, Allentown, Bethlehem, and Lancaster.

Though there has been an increasingly large number of unemployed miners, few have entered the metal products industries. Skills learned in mining could be transferred to the metal fabrication industries with a relatively short period of training. However, there is little opportunity offered to the miner to acquire skills needed in the metal fabrication industries. The skilled miner is, therefore, reluctant to enter an industry where he will be an unskilled worker. Another mobility barrier is the unfavorable differential in hourly rates of pay between anthracite mining and fabricated metal industries. This differential is accentuated by the low level of skill and, consequently, the low wage level at which the miner would have to enter the other occupations. Perhaps an even greater factor in the lack of mobility of the anthracite miner is the relatively high age of the miners.[5] At middle age or older it is difficult for a man to learn a new trade.

In the metal fabrication industries, access to raw materials and markets are important localizing factors. Of the raw materials for this region, rolled steel products, iron and steel castings, and aluminum are most important. Although there is no primary metals industry in the region, iron and steel foundries are present. As for general metal requirements, the smaller manufacturers are often able to patronize local or near-by steel warehouses for all or part of their needs. Major warehouses are located within the region at Pottsville and Shamokin. Larger plants, such as the aluminum fabricating plant and those requiring unusual sizes and shapes of steel, deal directly with the major metal suppliers in the Pittsburgh, Harrisburg, Bethlehem, or Philadelphia areas. It would appear that the region is favorably situated in regard to its basic raw material needs.

Since most of the metal products of this region are bulky and usually of relatively low value, an efficient transportation system is a necessity. At an early date this area developed one of the most intensive networks of railroads in eastern United States in order to export its anthracite. Within the present century a well integrated system of highways has also come into existence. Since this area lies near the center of the American Manufacturing belt its geographic position gives it a favorable market orientation. Only one plant in more than a dozen contacted felt that transportation facilities gave it a disadvantage in reaching its market.

Though the metal products industries have had only moderate growth in recent years, there is optimism regarding these industries. It is felt that they

[5] A comparison between age of bituminous coal and anthracite miners in 1950 shows a great difference in Pennsylvania. Though only 29.8 per cent of the bituminous miners were over 50 years of age, 41.5 per cent of the anthracite miners were in that age group. For workers under 24 years, only 3.5 per cent were in anthracite mining, whereas 10.5 per cent of those in bituminous coal miners were in this age group.

present the best opportunity for creating the much desired economic stability in the area. Metal products industries which can secure raw materials from established channels, requiring semi- and unskilled labor, and plant structures that are not highly specialized, have a good chance to succeed in the area.

Tanning and Leather Products

Because of the simplicity of the tanning process, the availability of tanning extract from the hemlock forests, and a growing local market for leather, many small tanning and leather plants were established in the Southern Anthracite Region at an early date. However, with the decline of the hemlock forests and the lack of raw hides within the area, the tanning industry had essentially disappeared from the region by 1930.

Tanning of leather is no longer of importance, but the leather products industry, primarily shoe manufacturing, has remained as a result of acquired skills in leather working combined with both a local and regional market (Fig. 7). The industry produces primarily children's shoes, where the style factor is not very important, thus reducing to a minimum seasonal and cyclical fluctuations.

Though the leather products industry in the Southern Anthracite Region has had a limited but generally steady rise in employment, the area's relative importance among the anthracite counties has recently declined. From 1880 until about 1940 the leather products industry of Schuylkill County occupied first place among the anthracite counties. However, since 1940, the county has dropped to fourth place within the anthracite region. This trend has resulted from an active program of encouraging the expansion of the leather industry in the Northern Anthracite Region. Without the initiation of a brisk developmental program in the Southern Anthracite Region, the leather industry will undoubtedly remain small or possibly even disappear.

Food and Kindred Products

The processing of foods for local consumption has occupied third or fourth place in manufacturing during the past 30 years (Fig. 7). Employment has been fairly steady but quite small, varying between 1100 and 1900 workers. Of the commodities produced, bread and bakery products are most important with about 40 per cent of employment, followed by the brewing of beer with about 15 per cent of employment. Other food and kindred products of importance include carbonated and soft drinks, ice cream, slaughtering and meat packing, potato chips, and pretzels.

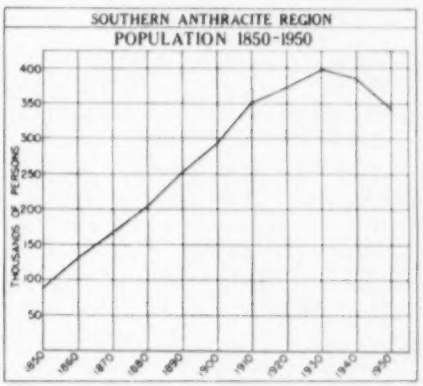


FIG. 11. Population trends by decades from 1850 to 1950. Compare with Fig. 1.

Food manufacturing is, thus, largely limited to producing products which are perishable or bulky. The plants are extremely small, only a few with more than 25 workers. Since this region is so limited agriculturally, there are practically no local products, such as peas, beans, or corn, to process.

Essentially all food must be imported into the region, and processing is limited to providing the needs of the local markets. There is likely to be little expansion in food products industries, and there may even be a decline as population decreases in the area.

Chemical Industry

A specialized chemical industry, the manufacture of powder and explosives for the mining industry, has long existed in the anthracite region. At no time, however, has this industry been of major importance to the area. Employment has risen with minor fluctuations for the Southern Anthracite Region from a total of 269 in 1915 to a peak of 1617 in 1947, but had declined to 1184 by 1953 (Fig. 7). Over 98 per cent of this employment is concentrated in one plant at Tamaqua (Fig. 8).

In the chemical industry, access to raw materials, low cost power, and near-by markets are important localizing factors. The availability of a labor supply is a minor factor in attracting new chemical industries.[6] Since the anthracite area lacks chemical raw materials, is a generally high cost electric power area, and has a shrinking market even for the present chemicals as a result of the declining anthracite industry, there is little hope for an expanded chemical industry.

OTHER ECONOMIC PURSUITS

Besides manufacturing and mining there are practically no economic activities in the Southern Anthracite Region. While the area is still more than 75 per cent wooded, there is little available commercial timber. This valuable resource was so misused in the early years through the production of timber and mine props for the anthracite industry that its present capacity for furnishing employment and contributing to the wealth of the region falls far short of what it should be.[7] In Schuylkill County it is estimated that only 5 per cent of the timber is in merchantable stands. Lumbering for saw timber and to meet the demands of the mining industry have cut all virgin timber and considerable quantities of second and even third growth. Lumbering has been a clear-cutting process and in many instances has been followed by devastating fires. Moreover, much of the land surface is scarred with strippings and piled with waste banks where the dominant industry of mining has taken its toll. Coal companies own about one-third of the forest land of this region. Despite past abuse, however, most of the forest lands still are capable of growing good timber. With proper management and fire control, these lands could become productive in possibly half a century.

Largely because of the rugged topography, poor soils, and use of land for mining and for forests, agriculture is of minor importance in the Southern Anthracite Region, occupying less than 20 per cent of the land. The farms are small and agriculture is diversified, producing a wide variety of products such as poultry, vegetables, and livestock which are largely consumed in near-by urban agglomerations. A large portion of the farms of the area are not operated on a commercial basis and do not provide the main source of income for their residents. Of the commercial farmers, many supplement their farm income by some off-farm work, par-

[6] Wage costs as a per cent of value added in selected industries in Pennsylvania in 1950 show chemical industry as 22 per cent, food and kindred products 30 per cent, textile 48 per cent, and leather products 50 per cent.

[7] *The Forests of the Anthracite Region—A Problem Analysis*, U. S. Department of Agriculture, Forestry Service, Staff of the Anthracite Branch of the Northeastern Forest Experiment Station, Oct. 1, 1947.

ticularly during the winter months. Because of the physical limitations to agriculture, it cannot be expected that farming will aid in the economic stabilization of the region.

Besides anthracite, there is no other important mineral wealth. Shale deposits have provided the basis of a brick industry, but since construction has been small in recent years this industry has declined with the general economic trend of the region.

In conclusion, it would appear that neither agriculture, lumbering, nor a new mining endeavor can be expected to aid in solving the present economic problems.

REGIONAL AFFECTS OF A DECLINING ECONOMY

The declining economic opportunities affect all facets of life in the Southern Anthracite Region adversely. In general, the people of the region have one of the lowest standards of living in the state. The area is largely urban in nature and a comparison of family income of anthracite cities with other cities in Pennsylvania reveals a wide, unfavorable discrepancy. In 1949 the census revealed that the median family income for Mt. Carmel, a typical city of the region, was $2384, the lowest in the state for cities of 10,000 to 50,000 in size. On the whole, family incomes were five hundred to six hundred dollars below the average for other urban dwellers in Pennsylvania in 1949.[8] The low family incomes are due to a combination of long periods of unemployment in the anthracite industry and the existence of low-paying types of manufacturing.

[8] Median family incomes for Southern Anthracite Region cites of 10,000 to 50,000 in 1949: Pottsville, $2781; Shamokin $2696; Shenandoah, $2657; Tamaqua $2994. Median family incomes of other representative cities of Pennsylvania: Pittsburgh, $3314; Harrisburg, $3303; West Chester, $3493; Meadville, $3354.

One of the closest correlations with the economic trends is revealed in population curves of the region. From 1820 to 1930 population increased each decade reaching a peak of 397,017 (Fig. 11). As anthracite production increased, the population of the Southern Anthracite Region grew considerably more rapidly than that of the state as a whole. While a retardation in population growth for the state as a whole occurred in the decades following 1930, the Southern Anthracite Region was one of the few areas where the absolute declines were very large. From 1930 to 1950 the population of the region declined by over 58,000. This is a consequence of constantly decreasing relative economic attractiveness of the region. But for the generally widespread depression of the 1930's, there might have been an even greater decline in the anthracite fields during that decade. As employment opportunities increased throughout the East, dating approximately from 1940, the exodus from the region has swelled to almost flood proportions.

A highly significant phenomenon of this migration has been the change in the age composition of the population (Fig. 13). For example, in Schuylkill County in 1940 there were 48,482 persons in the age group between 10 and 19 and 41,200 in the 20 to 29 age group. By 1950 the numbers had declined in these age groups to 30,307 and 30,828 respectively. In contrast the age groups between 30 and 65 remained approximately static, and the number of persons over 60 increased considerably during the decade.[9]

The exodus was thus primarily of the young rather than the old. Outmigrations induced by dissatisfaction with local economic opportunities and

[9] The age group over 60 between 1940 and 1950 rose from 19,738 to 29,624.

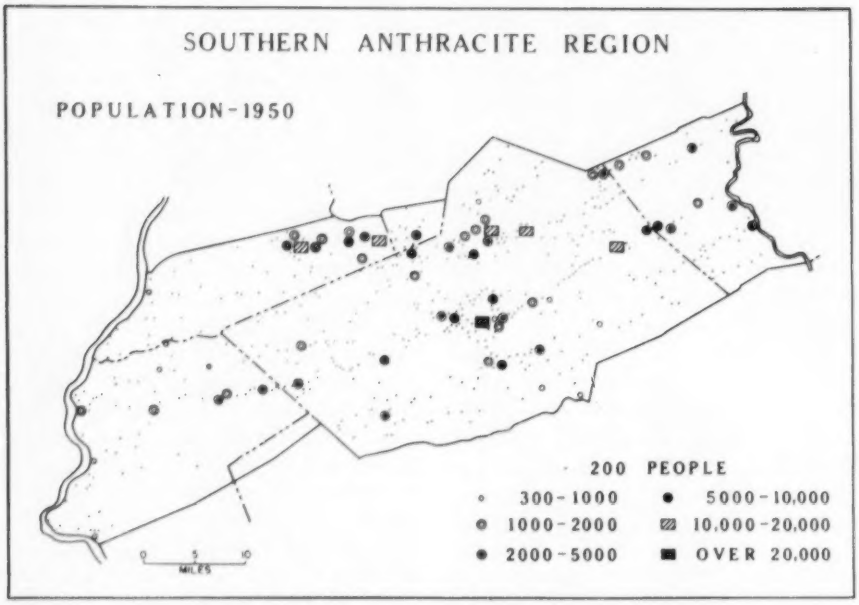


FIG. 12. Distribution of population in 1950. Compare with Fig. 4.

by the brighter prospects of jobs elsewhere appealed to members of the younger group who had not established homes and were more easily able to take advantage of employment opportunities. Occupational habits, advancing years, community ties, and, in some cases ownership of property, make it difficult, if not impossible, for the older person to begin a new career elsewhere.

Besides the permanent migration from the region, many of the people commute daily to neighboring cities where job opportunities are more plentiful. It is now common practice for many men to drive as much as 80 to 100 miles each day to and from their work. Many people in the Pottsville area commute to and from the Reading and Philadelphia area by train each day (Fig. 14). This is one of the few areas in Pennsylvania lying off the main railroad routes that is still effectively served by local passenger service.

There has also been a change in the sex composition of the population. During the period of rising anthracite production the ratio of males to females was quite high, reaching a peak between 1910 and 1920 with 112 males to 100 females. The ratio has declined in every succeeding census so that by 1950 there were approximately 102 women to 100 men. The growth of mining in the earlier years attracted substantial numbers of immigrants, often single men, tending to promote an excess of males over females. With the cessation decline in anthracite production, the area ceased to attract immigrant labor. The decline in the anthracite industry meant a decline in job opportunities for men. At the same time the growing textile and apparel industries have steadily increased job possibilities for women relative to those for men in the area. Consequently, the exodus since 1940 has been predomi-

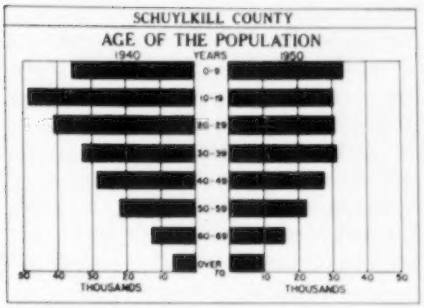


FIG. 13. The average age of the population of Schuylkill, the principal county of the region, is notably greater in 1950 than it was in 1940.

nately of the young men of the region.

This unbalanced migration has created a number of related problems. For example, in 1950 only about 52 per cent of the population of the region were married, compared with over 58 per cent for the state as a whole. According to the Census Bureau this is a "relatively small proportion." This situation reflects the prolonged depression, insecurity of employment, and growing disparity in sex distributions. The married person with a family is leaving the region to seek employment elsewhere.

The construction of houses in the region has closely followed a curve similar to that of anthracite production. Over 75 per cent of the houses were built prior to 1920, about 20 per cent were built between 1920 and 1940, and only about 5 per cent since 1940. About one-half of the houses are one dwelling units, about one quarter are semi-detached, about 15 per cent are two- to four-dwelling unit structures, and only about 3 per cent are apartments. The value of all housing is fairly low. For the one-dwelling owner-occupied unit, about one dwelling in four was valued at less than $3000 as of April 1, 1950. Nearly 60 per cent were valued at less than $5000, one-third, at $5000 to $10,000, and only about 7 per cent were valued at $10,000 or more. The median value of one-dwelling units in Schuylkill County in 1950 was $4872 and in Carbon County $5304. This compares with a median value of $8922 in Allegheny County, $7009 in Philadelphia County, and $7821 in Lancaster County.

The low value of homes in the anthracite region indicates something of their poor quality. Dwellings in the region are, for example, rather poorly equipped insofar as plumbing facilities are concerned. Only about seven dwellings in ten have private bath facilities, a little less than a quarter have only running water, and about 8 per cent have no running water. About 8 to 10 per cent of the homes are classified as dilapidated by the 1950 Census on Housing.

Although the population of the region is declining there were few dwelling units vacant or available for rent or sale in recent years. As of April 1, 1950, only 346 dwelling units out of 56,651 or 0.61 per cent were vacant

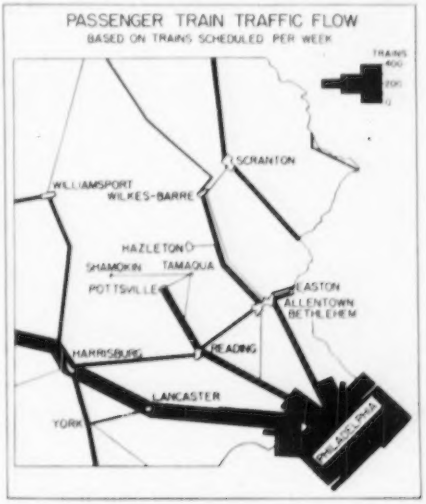


FIG. 14. The Southern Anthracite Region is well served by passenger trains.

and listed for rent or sale in Schuylkill County. This situation is largely due to the fact that the exodus has been the younger people from families already established in the area, and, consequently, houses were not vacated by the out-migration. There has always been a problem of overcrowding in the anthracite region so that in recent years many families were able for the first time to secure an individual home.

Whereas there has been a general decline in the economy, the owner-occupied dwellings have greatly increased since 1940, from approximately 48 per cent to 62 per cent in the region as a whole. The desire of older persons to own their own homes is largely responsible for this trend. It has been encouraged by anthracite companies in their desire to sell company-owned houses to the miners. At times this appears as a selfish motive on the part of companies in selling houses before mining operations stop in order to obtain the highest possible prices.

CONCLUSIONS

Though the problems of this area have long been recognized, even a partial solution to them has not been forthcoming.[10] The failure to cope successfully with the problems of the anthracite region may be due to the lack of viewing the economy as an integrated whole. The usual approach is to study the situation of the anthracite industry, poor housing, trends in manufacturing, or some other phase as if they were separate entities. Likewise, individual communities or small districts have tried to solve their problems by limited approaches such as the construction of a single factory building, enticing industry to their town by lowering taxes, or some other similar device. This method of attacking the crucial problems of the area has led only to confusion.

If the problems of this area are to be solved, an overall co-ordinated plan of economic development for the region is basic. Since many of the fundamental problems of the Southern Anthracite Region center on spatial relationships, geographical analysis should play an important role in the development of such a plan. Here, as in other declining mineral areas of the country, is a laboratory in which the geographer can play a vital role.

[10] In July, 1954, 20.3 per cent of the workers in Schuylkill County, and 22.3 per cent in Carbon County were unemployed.

INSTITUTIONAL BARRIERS TO ECONOMIC DEVELOPMENT—SOME EXAMPLES FROM BOLIVIA*

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PERHAPS in no other Latin American country does the institutional background play such an important role in delaying utilization of relatively abundant natural resources as it does in the land-locked central Andean Republic of Bolivia. Foremost among institutional factors contributing to the nation's economic peculiarities is the medieval system of land tenure which has permitted a privileged few to obtain unrestricted control over large portions of the most fertile land. These properties are held in the iron grip of a system of ownership which places inordinate emphasis on the status quo. Efforts to alter the static, time-honored relationship between the man who owns the land and the one who tills it, toward increasing productivity and widening distribution of the economic return, are vigorously resisted. Since the assessed value of land held in great landed estates is low, and the tax rate is negligible, land capable of considerable productivity may lie idle while the inhabitants of the region suffer from extreme privation. Meanwhile, during the most inflationary period in Bolivian history the value of this idle real estate spirals rapidly upward.

The vast majority of Bolivian laborers are pre-industrial agriculturists whose daily activities are almost totally unrelated to the market economies prevailing in the cities and mining regions. Held for centuries in an institutional straitjacket, the laces of which have been loosened only slightly in recent decades, the Indian has been molded into a stoic, sullen individual suspicious of a national government he does not understand. An inadequate diet, lack of education, the adverse physical environment prevailing in the extremely high altitude mines, and addiction to the stupifying coca leaf—also have contributed to glaring inefficiencies in the utilization of this potentially valuable human resource. Among white collar workers, an inordinate number of miserably paid, overly proud individuals compete ruthlessly for the few salaried positions available in this underdeveloped economy, thus contributing to an ever-increasing urban proletariat in a country where the labor force is actually small in relation to potential resources. Labor legislation, borrowed piecemeal from nations with markedly different economic and social problems, is poorly adapted to the Bolivian scene and the area of misunderstanding between the national government and business interests is thus broadened.

*The field research on which this paper is based was conducted during three widely separated intervals (1944–46; 1951; 1952–53) during which the author was consultant to various government agencies. Financial aid provided by the Tulane University Council on Research while this paper was in progress is hereby gratefully acknowledged.

The economic development of the country has also been slowed considerably by spiraling inflation, by confused handling of foreign exchange rates, and by a system of taxation which is inadequate, unbalanced, and only lethargically enforced. During the post war period, capital flight to neighboring countries for safe keeping or investment purposes has not been confined, as is customary, to government officials momentarily expecting the political ax to fall, but has become widespread among individuals who might otherwise have supplied a significant portion of the capital necessary for developmental purposes. Multiple foreign exchange rates, originally conceived as a subsidy for the consumer by fixing low prices on imported food, have been manipulated to provide high-cost national manufacturers with low-cost raw materials. This type of transaction had become so lucrative that, in 1951, fictitious companies existed simply to profit on the resale of the imported materials.[1] A mercantilistic attitude toward outlying regions of the country by those in control of the central government tends to concentrate commercial activity and developmental effort on uneconomic projects in the highlands to the detriment of potentially more productive areas in the adjacent lowlands. In view of the scarcity of local capital accumulation, of meager economic assistance grants, and of the magnitude of the work to be accomplished, this is a particularly damaging tendency.

As a prime consequence of the institutional phenomena influencing economic decisions, the introduction of modern technology is tending to alleviate the condition of the majority of Bolivians occupying the lowest rung of the economic ladder only incidentally, whereas persons firmly entrenched on the top rung are recipients of the lion's share of the benefits accruing from increased productivity. Thus the gap between economic groups which the introduction of modern technology might have narrowed is instead being widened.

This paper attempts to isolate and analyze the most significant cultural handicaps to integrated economic development in Bolivia. For organizational purposes, illustrative examples are arranged according to the cost-determining factors of production most critically involved in planned economic development—land, labor, and capital. Readers intimately familiar with underdeveloped areas elsewhere may perhaps recognize in certain parallel situations an institutional common denominator which is becoming increasingly more evident as underdeveloped economies are subjected to analysis.

LAND: TENURE PROBLEMS IN THE HIGHLANDS

Having been driven from their Mediterranean homeland by lack of opportunity on the land, the Spanish *Conquistadores* encountered on the bleak intermontane plateau of Bolivia, in contrast, a smoothly operating communal agrarian system which had survived for at least 20 centuries. Within the framework of these communal agglomerations known as *allyus*, all land was held collectively. The European concept of private ownership of land was unknown on this lofty tableland until the Spaniard superimposed the manorial system on the indigenous communal landscape. Many Indian communities situated in more isolated recesses of the Altiplano managed to escape the initial onslaught and continued to survive, but their more arable lands are constantly being encroached

[1] Personal interview with a Bolivian government official.

upon by the expanding estates of private landowners.[2] Several centuries of domination by static manorial life and inordinate emphasis on the extraction of minerals have contributed to the decay of agricultural practices and consequent social disintegration. Irrigation works have disappeared, agricultural terraces have crumbled, the land has become sterile, and flocks have been depleted. Although the smouldering restlessness of the Indians has been ruthlessly suppressed through the centuries, it has found outward manifestation in recent years in the form of passive resistance strikes during which Indians refuse to cultivate the owners' fields. As a consequence, estate agricultural production has been curtailed substantially.[3]

Community Indians are also hedged around by physical and cultural barriers to material progress. For example, surviving communities are relegated to the higher, more infertile sectors of the mountains, a physical cleavage which has unfavorably influenced agricultural yields and crop varieties. Thus an altitudinal zoning appears to have emerged as these two mutually antagonistic institutional organizations—the Indian community and great landed estate—have struggled for control of the more favored physical sites. But the estate has increasingly dominated agrarian organization in Bolivia, thereby providing the landowners with economic security as well as social prestige and political power.[4]

Efforts to maximize agricultural productivity solely by technical innovation are encountering serious resistances wherever medieval tenure systems predominate. It may prove enlightening, therefore, to analyze in greater detail the socio-economic conditions prevailing on representative land units in the Bolivian highlands. *Finca Masaya*, a great landed estate, and *Communidad Arcata*, a highland Indian community, have been selected from numerous individual studies conducted during three separate periods of field investigation.[5] These agrarian units are approximately equal in size—9000 acres—and are situated in close proximity to one another at 13,000 feet elevation near the southern shore of Lake Titicaca and only 30 miles from La Paz, Bolivia's cosmopolitan capital. But here general similarities cease. On *Masaya* only 215 acres are cultivated by the Indians for the benefit of the owner. Although the 85 Indian families cultivate an additional 340 acres in subsistence plots allotted to them, an average of four acres per family, almost none of this production is channeled into the commercial market. The more independent community Indians on *Arcata*, by comparison, cultivate 7425 acres, each of

[2] Frank L. Keller: "Finca Ingavi—A Medieval Survival on the Bolivian Altiplano," *Econ. Geog.*, Vol. 26, 1950, p. 37. The 1950 agricultural census indicated that 4.5 per cent of the landowners controlled 70 per cent of the rural land. See Abraham Larreta Arias, "The Bolivian Revolution," *America*, Vol. 44, No. 2, August, 1954, p. 44.

[3] On the 2nd of August 1953 the very popular revolutionary government of Victor Paz Estenssoro instituted an agrarian reform program by supreme decree. Although successful implementation of this program will depend on a multitude of related factors inside and outside the Bolivian economy, the architects of agrarian reform in Bolivia are using the Mexican experience in land reform as a guide. A preliminary study of the provisions of the Bolivian law indicates that due attention has been paid to the now famous Article 27 of the Mexican Constitution of 1917 which expressed for the first time in western culture a functional theory of land tenure in that ownership of land carries with it the responsibility for socially harmonious use. An analysis of the economic and social reforms of the Paz Estenssoro administration will be presented in a forthcoming paper.

[4] Frank L. Keller: "Geography of the Lake Titicaca Basin of Bolivia—A Comparative Study of Great-landed Estates and Highland Indian Communities," microfilmed doctoral dissertation, University of Maryland, 1949, p. 41 ff.

[5] *Ibid.*, Chaps. 3 and 4.

the 500 families utilizing approximately 15 acres. In number of livestock being grazed, production of wool and the manufacture of such by-products as cheese and *chuño*, the dessicated potato of the Altiplano, the comparison similarly favors the community organization. Moreover, during the slack season Indians on *Arcata* may seek employment in the mines and often supplement their diet by fishing, opportunities denied the inhabitants of *Masaya*. In terms of intensity of land use, human and animal carrying capacity, surplus production, and equality in the distribution of the fruits of labor, *Communidad Arcata* is undoubtedly the more efficient unit.

In the maintenance of human dignity the discrepancies between the great landed estate and the community are equally large. Estate Indians literally belong to the agrarian unit to which they are attached, and are held in this lowly status by vagabondage laws, unlawful coercion, and lack of opportunity, to put it mildly, elsewhere in the Bolivian economy. If *Masaya* were sold, the Indian inhabitants would be included in the purchase price of the estate in that a subjective evaluation certainly would be made of their amenability and productive capacity. Although the tiny plots allocated to the Indian families are hardly large enough to meet barest subsistence standards, the duties required in repayment are time-consuming and often humiliating. The Indian agriculturist must plow, cultivate, and harvest the owner's fields using his oxen and primitive agricultural implements; he must care for and pasture the owner's livestock, shear his sheep, manufacture by-products, and transport the surplus produce to market. Invariably, these duties coincide with the period during which the Indian should be working his parcels of land if maximum production is to be realized under existing conditions. Moreover, the Indian by custom is required to serve the owner in his home in La Paz and in the hacienda house on the estate. Although this form of serfdom, termed *pongueaje*, has been outlawed periodically, the practice not only continues in many rural areas but is being extended to include onerous duties for the half-breed administrator on the estate who has unlimited authority over the inhabitants in the absence of the owner, who lives in La Paz and rarely visits the property.

The intensity of agricultural activity on *Masaya* is not really important to the owner. For prestige purposes, simple ownership of a large estate is sufficient to establish his position in society. So long as the urban dwelling landlord receives his customary income in money, in kind or in services, he is content to defend stoutly the agrarian organization that was imposed on the indigenous inhabitants by force of arms during the Conquest and was further entrenched during the Republican period. Ingrained by centuries of tradition, the economic attitudes of the landlord were inherited with all the cultural baggage of his caste, and Bolivia's physical isolation has aided in preserving this institutional anachronism.

Despite many centuries of dogged resistance to concerted attack by a strong hostile force, community government in *Arcata* remains relatively effective. Police officials stationed in the immediate locality exercise political control in the name of the central government, essentially for tax collection purposes, operating through a head man in the community, the *jilacata*, but his power is actually limited to moral suasion only. He must seek assistance of the local police when his decisions require force. The only facets of com-

munity government of interest to the police are tax imposition and collection, so the Indians in *Arcata* genuinely have a large measure of self-government. Various elders assist the *jilacata* in governing the 2000 inhabitants—one attempts to protect community lands from encroachment by strangers; one insures equitable distribution of land parcels and irrigation waters; another operates a school system, which the great landed estate lacks. Among the 673 school-age children, there are 90 students who are assigned to four teachers. The most important community official from the viewpoint of the central government is the Indian who collects and delivers the territorial contribution to the central authorities. One can be assured that this territorial contribution is one Bolivian tax which is as high as the traffic will bear and collection of which is rigidly enforced.

It will require considerable time and effort for the reform-oriented Paz Estenssoro administration to unravel the snarl which has developed over ownership of community lands as a result of deliberate interference by previous governments. In 1866, Dictator Melgarejo, dissatisfied with the snail's pace at which community lands were being appropriated by large landowners, decreed that communal property simply did not exist in Bolivia. This decree made each Indian a private owner of the community plot currently assigned to him. As a private owner he could be forced into individual debt or otherwise legally divested of his land. But Melgarejo, like King Canute before him, may as well have decreed that the tides stand still. Although no longer having the protection of the Spanish Crown, stiff Indian resistance, by which they absolutely refused to lay claim to specific parcels of community land, caused this decree, enforcement of which was attempted frequently during the latter half of the Nineteenth Century, to be only partially effective.[6] A compromise was eventually worked out whereby each Indian remained a private owner of an undesignated parcel of community land. But as a consequence of the confusing legal jargon it is still possible for an estate owner with an air of legality to encroach on neighboring Indian lands by enlisting the cooperation of local police who exercise political control over the community.

LABOR: LIMITATIONS AND CAPABILITIES

The majority of Bolivia's working population is employed on the land. Since the agricultural labor force is not covered by any of the provisions of existing labor legislation, precise information relative to its actual size is unavailable. It has been variously estimated, however, that upwards of 75 per cent of Bolivian labor is completely unconnected with the market economy. Nor is there precise statistical information regarding workers employed in the mines, in transport, in industry, and in commerce. Informed estimates place the total number of manual laborers in mining, manufacturing, building, transport, and other branches of industrial activity at a mere 200,000. Less than 45,000 employees, one-third of whom are seasonal, form the backbone of the nation's economy through the extraction of critical and strategic minerals for export. Another 25,000 are employed in manufacturing. Transport and communications workers number 15,000,

[6] George McBride: *Agrarian Indian Communities of Highland Bolivia*, American Geographical Society, New York, Research Series No. 5, 1921, p. 26. "Between 1854 and 1900 (there was) up to 75% decrease in the number of Indian communities. . . ."

whereas only 10,000 laborers are estimated to be engaged in Bolivia's non-mechanized building and construction industry.[7] When compared with the country's potentially available resources, the paucity of manual workers in industry is indeed disheartening.

Over 100,000 persons, on the other hand, are employed on their own in various forms of personal services, and another 130,000 are salaried employees.[8] In the field of personal services, competition is literally cutthroat from the professional man, who generally is supported in his accustomed manner by rentals from agricultural properties rather than remuneration for professional services, to the lowly package bearer who is eager to carry anything from a piece of furniture to a box of pills for a mere pittance. Among salaried employees, prestige is generally considered to be more important than financial return. To wear a white collar, a suit no matter how threadbare, and tinted horned-rimmed glasses apparently is the ultimate ambition for many, although many positions in commerce and manufacturing provide a better return than salaried posts. One often observes a male white-collar employee assiduously manicuring an overly-long nail on the little finger. This furnishes proof to any interested person that the bearer is not a manual laborer, a type of activity which permits slight tolerance of long fingernails.

Some salaried positions are financially lucrative since they may be considerably augmented by commanding occasional additional emoluments in various forms. Since the spoils system is an accepted corollary of government service, a rather complete official house cleaning follows each change in government –violent or otherwise. Those individuals most directly responsible for the success of a revolutionary effort are given priority to select from the list of position vacancies. Unfortunately, good revolutionists are not always good administrators. More often than not a soldier or manual laborer assumes a position of considerable authority. Strangely, the higher salaried positions are often the last to be selected. For example, the position of Director of the Tax Bureau is rated approximately at twice the salary of one on a lower echelon, namely, the Tax Assessor. But since the Tax Assessor is in a position to obtain additional compensation by not being too uncompromising in his professional duties, this post is one of the first to be filled when a new government is formed.[9]

A surprisingly large body of labor legislation has been passed by the national congress or instituted by Presidential decree. It covers most of the aspects dealt with in more industrialized countries, but understandably becomes more socialistic in nature in dealing with industries operated by foreign interests than when concerned with occupations controlled by Bolivian nationals, as in agriculture where no labor code exists. Much of the existing legislation is overlapping, often hastily drafted in times of political turmoil, and many of the provisions are contradictory. Much of it has been lifted bodily from the labor code of neighboring countries and may only incidentally fit the Bolivian scene. Consequently, this ostensibly generous labor code has

[7] H. L. Keenleyside: "Report of the United Nations Mission of Technical Assistance to Bolivia" United Nations, New York, 1951, p. 94. As a result of this study an international commission sponsored by the United Nations was sent to Bolivia in 1951 to overhaul governmental administrative machinery. By the fall of 1952, extreme nationalism had seriously impaired the effectiveness of this mission.

[8] *Ibid.*

[9] Personal interview with Bolivian Government official.

become a political football to be kicked back and forth, or fumbled, by the incumbent government and the political opposition. Each side promises the worker a little more, with slight attention being paid to the acute need for actual accomplishment.[10]

In the field of industrial relations, mutual confidence between employer and employee is almost totally lacking. The trade union movement is still in the early stages of development; some employers still refuse to permit workers to organize in any form. National organizations exist among the miners and railway workers, but factory workers must bargain with employers on a company-wide basis. The spirit, temper, and possible future direction to be taken by the trade union movement in Bolivia may perhaps be judged best by reference to the main objectives of the Trade Union Federation of Bolivian Mine Workers, enunciated in 1946 and known as the *Pulacayo Thesis*. It may be translated in part as follows:

> "In Bolivia the proletariat is the social revolutionary class *par excellence* and the mine workers are the most advanced and combatant sector of the national proletariat. Though a backward country, Bolivia is a link in the chain of world capitalism, characterized by the fact that a bourgeoisie capable of liquidating agricultural feudalism and other economic features of the precapitalist period, of realizing national unification, and of throwing off the yoke of foreign imperialism has not yet appeared on the political scene. The workers must cooperate in bringing about the indispensable bourgeois-democratic revolution for the purposes of eliminating all vestiges of feudalism and freeing the country from foreign economic imperialism. But the bourgeois-democratic revolution must be regarded as only a step toward the proletarian revolution. True democracy can only be brought about through the dictatorship of the proletariat. Once in power, the workers cannot allow themselves to be confined indefinitely within the limits of the bourgeois democracy. They will find themselves obliged to make constantly increasing efforts to eliminate the system of private property so that the revolution may become permanent. The attempt, in alliance with other elements of the left, to secure transitional reforms must not induce the worker to compromise with his class enemies or with the representatives of 'Yankee' imperialism. All that the working class can ask of a purely bourgeois government on the other hand, is to enforce its own laws for the protection of the workers."[11]

The spiritual anesthesia of the Bolivian worker is the result of a combination of factors not of his making and beyond his ability to rectify in the immediate future. From an ossified, feudal past he has been subjected in recent years to the materialism of an industrial society which, as it has emerged in Bolivia, is not sufficiently productive to permit a happy accommodation between employer and employee. He is illiterate, or, to say the

[10] On October 31, 1952, the properties of the three great mining interests—Patiño, Aramayo and Hochschild—were nationalized and integrated into a government corporation, the *Corporacion Minero Boliviano*. Confronted by the need to institute immediate social and economic reforms in the mines, the new corporation attempted to offset falling tin prices by increasing output in the richer veins. Low grade ore, increasing mining costs, and lower tin prices are additional problems facing the nationalized mines.

[11] H. L. Keenleyside, *Op. cit.*, p. 95.

least, imperfectly educated, and speaks an indigenous language totally unrelated to Spanish. He lacks technical training; he is in poor health as a result of adverse working conditions, a poor diet, and a medical system which places a premium on the incantations of the *practicante*. Addiction to the coca leaf dulls his faculties and his appetite, yet is said to encourage output under extremely adverse working conditions. Drunkenness is widely prevalent, leading to undue absenteeism and irregular work. The "effective" work day for the underground laborer is estimated to be from two to five hours; thus the miner's wage scale is pitifully low. But in other respects the Bolivian worker is not so pathetic or apathetic. He has inherited from the pre-colonial civilization traditions of discipline, toil, and endurance, skill in handicrafts—and patience. But the institutional incentives needed to sharpen his dulled senses simply do not exist. Workers who could provide the active mass market are poverty-stricken or prefer to vegetate *por costumbre* outside the national economy.

CAPITAL: ACCUMULATION, ALLOCATION AND MANIPULATION

The critical problems to be dealt with in this discussion of the formation and use of capital may be grouped under the broad but related areas of inflation, capital flight, real estate speculation, the tax system, and foreign exchange and banking procedures. A long-continuing inflationary spiral, the ascent of which has steepened perceptibly in recent years, has eliminated the possibility of significant saving by the small but expanding middle class and by many of the wealthier people. For the non-savers, and this includes the vast majority of Bolivians, insidious inflation has forced a further reduction in the abysmally low real wage and has made negligible the value of any social benefits for which they may have been eligible. As the fountain from which continued capital investment would normally be expected to flow recedes and dries up, all developmental efforts are placed in serious jeopardy.

Increasing capital flight is both a cause and result of long-term inflation. As savings are transferred into foreign currencies and investments, the value of the national currency on the free exchange is reduced even further. Capital, which would normally be invested in local developmental projects, is instead contributing to the economic growth of the neighboring countries of Peru, Chile, and Argentina, or is being converted into dollars and held for safekeeping in the United States, thus aggravating the dollar shortage.

Another development which results from and contributes to inflationary pressures has been the use of surplus funds for short-term speculative purposes rather than the less spectacular investment in agriculture which would contribute to the healthy rural life needed to underpin a stable political regime. Residential and office construction in the highlands has been artificially stimulated as the directors of the centralized banking system condone the transfer of surplus savings from branch banks in other regions of the country to borrowers in the capital. In La Paz and Cochabamba, structures remain uncompleted as funds are absorbed by runaway inflation, while in Santa Cruz farmers requesting loans for agricultural development are turned aside.

The tax system which has evolved in Bolivia is an extremely complicated one, and compliance with the many statutes is grossly unsatisfactory. Since

there is little tradition of voluntary compliance, tax evasion is widespread; on the other hand, government employees have been subjected to withholding taxes for over a quarter century. Thus, underpaid government employees are required to carry a full tax load, however inadequate, whereas other sections of the economy find it easy and profitable to practice tax evasion. Although taxes in arrears are subjected to a relatively high interest rate of 12 per cent per annum, this penalty is inadequate since currency depreciation has been so rapid it is profitable to evade taxes and pay the penalty fixed by law, plus interest, when and if apprehended. Due to the relative laxity in tax law enforcement, capital which might have found its way into government coffers can be devoted to highly speculative enterprise.

Multiple taxation is another striking characteristic of the Bolivian system. On a national scale the government draws on 350 sources for taxes and customs duties. Lesser political entities, such as states and cities, have elaborate systems of taxation also, but for the most part these are ineffective. To cite an extreme example, a business man residing in the capital city of La Paz must consider the applicability of more than a thousand different classes of taxation.[12] Many ostensibly different taxes are actually identical, having been promulgated by a long succession of administrations instituted without an orderly transfer of authority. But despite the inordinate multiplicity of taxation, total collections are insufficient to permit the government to carry out its responsibilities for planned economic development. On the national level, approximately one-third of the taxes levied yield about $100 each per year; ten lucrative taxes yield the remainder of the governmental income. Moreover, dedication of specific revenues for particular purposes has reached the point of being ridiculous. Of the more than 350 types of national taxes, only 30 may be employed by the government in unrestricted fashion.[13]

Although it can not be regarded strictly as taxation, the profit made by the government on foreign exchange earnings serves a similar purpose. Prior to expropriation of the three large mining interests in 1952, exporters of raw materials were compelled to deliver to the government a portion of the foreign exchange received from the sale of minerals. This was exchanged for local currency at a rate far below the free market relationship of the *Boliviano* to the particular kind of hard currency earned. In this manner the operations of the exporter could be regulated by adjusting the value of the *Bolivianos* delivered to him for general operating expenses and exportable profit. The government would then sell the foreign exchange obtained in this manner to importers at a higher rate and retain the difference to cover part of the cost of operating the government. In a recent year these earnings amounted to 40 per cent of all national revenue.[14]

Real estate taxation is one of the weakest links in the entire revenue system, the extremely low taxation favoring land speculation and permitting land to remain unproductive. Most of the country's urban and rural landholdings have never been assessed; therefore the contribution to national and local revenues made by these properties is negligible. Another huge portion of urban and rural holdings is

[12] *Ibid.*, p. 29.

[13] *Ibid.*, p. 30.

[14] Boletin, Banco Central XXI (July, August, September, 1949), p. 54.

assessed by the owners. Needless to say, the declared assessment probably does not even reflect the true original value of the land. Not to be overlooked is the fact that acute inflation has widened further the yawning gap between real value and assessed value. Rural real estate and income taxes (assessed value plus reported income from the property) amount to approximately 0.1 per cent. Consequently, much of the land best suited to agriculture can be held out of production instead of being devoted to growing the kinds of foodstuffs now absorbing the major portion of foreign exchange earnings.

Lack of economic activity in the region straddling the all-weather highway reaching into the potentially productive hinterland north of Santa Cruz serves to illustrate how institutional attitudes prevent fertile land from being utilized fully. After completion of a resources inventory, this region was selected by economic planners as the logical place to produce the staples and fibres now being imported with scarce foreign exchange.[15] Although less than 10 per cent of the area along the highway is presently under cultivation, there is little evidence that the large landowners intend to develop the land. Instead, they are holding the choice properties for speculative purposes and as a hedge against the insidious inflation plaguing the economy. Consequently, agriculturists who wish to participate in the economic development program being instituted in the region are forced to utilize land out of profitable reach of the highway or less productive, drier areas to the south of Santa Cruz. *Campesinos* (agricultural laborers) seeking good land to cultivate became so frustrated that in the fall of 1952 an unsuccessful rebellion, witnessed by the author, broke out in an attempt to redress this socially inharmonious use of the land. The agricultural development program in Santa Cruz will remain stillborn so long as there is no attempt to reconstruct the outmoded agrarian framework prevailing in that region.[16]

Regulations governing foreign exchange have evolved through a generation of *ad hoc* legislation, the implementation of which has gradually reduced domestic agricultural production. Multiple and mixed exchange rates were originally devised to facilitate essential imports of manufactures and machinery, but soon were manipulated by politically shaky administrations to maintain low prices on imported foodstuffs and thus curb the cost-of-living rise for the majority of Bolivians while pursuing an inflationary policy elsewhere in the national economy. Selling foreign exchange to importers of essential foodstuffs, raw materials, and manufactured items at a rate of exchange below which it has been obtained represents a subsidy to the Bolivian consumer if the importer chooses to comply with price ceilings and passes the savings on to the consumer. If this does not occur, the importer instead is subsidized. This may be a compelling reason why commercial people in La Paz are generally unhappy over the prospect of integrated economic development and self-sufficiency in essential foodstuffs.

Domestic agricultural production has become more and more disorganized by the low rate of exchange granted to importers of foodstuffs and agricultural raw materials, a policy which has

[15] Frank L. Keller: "Resources Inventory—A Basic Step in Economic Development," *Econ. Geog.*, Vol. 29, 1953, pp. 39–47.

[16] See Raymond E. Crist: "Bolivia—Land of Contrasts," *Amer. Journ. of Econ. and Soc.*, Vol. 5, 1946, p. 297 ff.

penalized the agriculturist in favor of commercial interests in La Paz. In order to support the national high-cost textile industry, for example, low rates of exchange have been approved for the importation of cotton. Yet finished textiles are sold at a higher price than competing imported products. As the textile manufacturer faces stiffer competition from imported goods, he demands even cheaper raw material prices, or tariff protection, to avoid the threat of unemployment in the industry, a threat which cannot be ignored by the national administration. Since the Bolivian farmer cannot produce cotton at a price below the heavily subsidized imported product, less cotton is produced each year despite attempts by technical experts to increase domestic cotton production by financial grants and the application of improved techniques. Similarly, the production of wheat is declining in the fertile Cochabamba Valley whereas corn, from which the fermented intoxicant, *chica*, is brewed, increases in annual production. This is occurring despite the headway being made at the agricultural experiment station at Cochabamba, operated jointly by United States and Bolivian technicians, in developing hardier and more productive wheat varieties. In short, corn production pays but wheat production cannot so long as imported wheat is so generously subsidized.

The problem of sugar production in the lowland belt to the north of Santa Cruz is yet another example of the chaos which has developed by arbitrary application of the multiple exchange system. In the fall of 1952 the sugar importer in La Paz could obtain dollar exchange at a very favorable rate. Sugar imported from Peru was being sold in La Paz for less than its wholesale price in Arequipa, where the sugar was refined. Due to this high subsidy, Peruvian sugar could be sold in Santa Cruz, center of Bolivian sugar production, for less than the cost of production in Santa Cruz. Consequently, most of the sugar produced in Santa Cruz was converted into high value alcohol.

Uneconomical allocation of capital resources in the mineral economy of Bolivia has retarded integrated economic development, although possibly to a lesser extent than manipulation of the foreign exchange rate has lowered the agricultural potential. To relate a brief economic history of YPFB (*Yacimientos Petroliferos Fiscales Bolivianos*), the state petroleum monopoly, is to illustrate the point. In 1941 the Bolivian Development Corporation negotiated a loan for $8,500,000 with the Export-Import Bank to be utilized by YPFB to increase production of petroleum in the three most promising fields—Bermejo, Camiri, and Sanandita. The Standard Oil Company of New Jersey, from whom the original concessions were expropriated in 1937, was indemnified for its losses in the amount of $1,500,000, leaving $7,000,000 for developmental purposes in Bolivia. The entire loan was to be repaid, with interest, during an eight-year period. These funds, however, were used to increase refining capacity and to construct pipelines connecting the producing fields and the consuming areas in the highlands, while the acute need to increase production was almost wholly neglected. Total refining capacity soon reached approximately 12,000 barrels per day whereas production hovered around 1500 barrels per day. Since 3000 barrels per day were required to operate the pipelines at minimum efficiency, water was pumped into the system at the producing end in order to maintain the proper pressure. At the Cochabamba and Sucre termini of the pipelines, where the refineries are

located, the water was removed before processing the petroleum commenced. Thus, in late 1952, refinery capacity totalled 12,000 b. p. d., consumption amounted to 3500 b. p. d. and production was only 1500 b. p. d.—which necessitated the importation of petroleum products.[17]

In order to import petroleum products at low cost, the government-operated YPFB persuaded the administration to declare these products essential items, thus qualifying YPFB to utilize the favorable exchange rate established for such items. This enabled YPFB to purchase petroleum at a relatively low price, but a relatively high price was maintained on the retailed product within the country. The resulting large *Boliviano* profit was used for further conversion of *Bolivianos* into dollars at the Central Bank at the low rate. By importing petroleum, YPFB was able to realize in dollar profits approximately $2,500,000 each year in order to service the Export-Import Bank loan.

But if the company were to increase domestic production to meet or exceed consumption needs, obviously there would be no need to use the favorable exchange rate for the importation of petroleum. Without dollars obtained from the exchange system, however, YPFB could not meet its loan obligations. Thus, profits shown by YPFB during recent years have resulted from foreign exchange manipulation rather than actual earnings on the operation of the company.[18]

[17] U. S. Embassy, La Paz, Bolivia.

[18] On September 6, 1954, the *Foreign Commerce Weekly* reported that petroleum production in Bolivia had been pushed to 6900 barrels daily while domestic consumption was 3800 barrels daily. This increase in production has largely resulted from an additional Export-Import Bank loan. YPFB is now an exporter of petroleum and therefore contributed to foreign exchange earnings, although on a very small scale and in soft currencies.

SUMMARY AND CONCLUSION

In the preceding paragraphs an attempt has been made to isolate and analyze in some detail what are considered to be the most stubborn cultural resistances to the economic development of Bolivia. For purposes of clarity in presentation, the illustrations used were grouped under three broad divisions representing cost-determining factors of production. It has been pointed out how contemporary attitudes toward the utilization of agricultural land have resulted from a super-imposition of European manorial tenures on the indigenous communal patterns. The cross-purposes which have evolved in agrarian policy are serving to stultify productivity and hamper to a significant degree concerted efforts by foreign technicians to increase agricultural surpluses through technical innovation.

Although harsh physical conditions in the more populated regions of the country contribute to labor inefficiency, institutional barriers surrounding the pursuit of education, the search for better health, and the improvement of dietary standards seriously limit the productivity of the human resource. An imperfect blending of diverse cultures has produced an institutional dichotomy which may delay for some time formation of the national cohesion requisite for integrated internal development. Diametrically opposed political philosophies are driving laboring groups, organized and unorganized, into uncompromising opposition to political regimes which do not become completely servile to their demands for immediate economic betterment.

Acute inflation, real estate speculation, a misdirected foreign exchange system, and capital flight have served to divert or absorb accumulating funds, the re-investment of which are essential

for continued economic growth. An inadequate tax system, rather than permitting faster accumulation of capital resources by private interests, serves only to reduce national revenue below the level necessary for successful implementation of government sponsored developmental programs.

Thus far architects of planned economic development in Bolivia have become deeply involved in conducting a frontal attack on problems arising from peculiarities of the physical environment. Almost neglected have been those resistances to increased productivity stemming from the economic, social, and political institutions peculiar to underdeveloped regions. Due to international political considerations, policy makers generally have refrained from attempting to overhaul the whole technique of government, despite widespread recognition that institutional problems are creating an ever-widening hiatus between industrial potential and actual production. Problems capable of solution with a minimum of delay and embarrassment have attracted primary attention. Tools and techniques currently available in more advanced nations have been employed without attempting to disturb the existing institutional framework in the less developed region. But the mere introduction of the technology of an industrial society into a pre-industrial culture has created chain-reaction reverberations throughout the body politic of this country. Although not actually constituting deliberate interference in the cultural affairs of a friendly people, the effect has been strikingly similar. No matter how promising technological innovations might appear to be, so long as economic development is confined within the bounds of an institutional straitjacket limiting full productivity the legitimate aspirations of millions of restive people will not be satisfied. The existing institutional framework, in some instances actually medieval in character, should be examined coldly, analyzed, and reoriented along lines permitting maximum realization of the benefits an integrated developmental program is capable of producing.

MAPPING CULTURAL GROUPS IN AN AMERICAN INDUSTRIAL CITY

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MANY cities in the United States have been known for years to contain large elements of population with diverse cultural backgrounds. This condition exists primarily in the larger industrial and commercial centers in the eastern part of the country, which have attracted groups of laborers having distinct linguistic, social, and religious differences. In addition, such cities have drawn varying numbers of Negroes from the southern states, thus adding to the complexity of the social pattern. Many of the social groups have settled in compact or homogeneous neighborhoods somewhat apart from others. Problems have multiplied under these conditions that have attracted the attention and aroused the concern of sociologists, psychologists, social workers, city planners, and others.

Students of urban geography, as well as those of some of the other social sciences, have been interested in the distribution of these peoples within certain areas and in the relation of such groups to their surroundings. However, due to a lack of suitable statistical information, presentation of the patterns of cultural groups on a map requires field investigation.

A method developed in a recent study of Worcester, Massachusetts, provided a practical way of investigating the pattern of cultural groups in that city. It may serve as a guide to similar investigations in other urban areas. A description of the method is the subject of this article.

"Cultural Group" Defined

A "cultural group," as defined in the Worcester study, consists of people having to some degree common social characteristics, habits, customs, and traditions. Except for some of the Yankees, most groups in Worcester are transplanted cultural units which have taken root in some sections of the city where they have been able to maintain their uniqueness and continue to develop along their particular group lines. Religious training, the upholding of certain customs, and the teaching of native languages to children have contributed to foster in the descendants some of the characteristics possessed by the immigrants. In many instances, such groups continue to occupy distinct areas within the city.

Group consciousness among the members of the social units is a common characteristic. Some groups, for example, the Yankees, do not have such a strong group consciousness as others. They have acted more as partial barriers to expansion of more closely-knit units than as actual communities. Nevertheless, such groups occupy places in the cultural pattern, and it is proper that they be represented on the map.

CENSUS DATA

The lack of adequate statistical information poses serious problems in determining the pattern of cultural groups. Census data on foreign-born residents in the United States have been used in making some maps of social groups. But there are two important objections to the use of data on foreign-born residents as a basis for mapping social groups in Worcester. The first is that only data on foreign-born and children of foreign-born parents are available, whereas some social groups maintain their identities through several generations. Secondly, such data allow no distinction between religious groups from the same country. For example, both Jews and Catholics from Poland came to the city in large numbers. Though coming from the same country, they constitute distinct social groups. Obviously, social background should be measured by more than country of birth. In spite of these limitations census data would have proved a valuable auxiliary source of information in the present study had they been available by small units. But, unfortunately, census tracts had not been set up for Worcester at the time the study was carried on.

THE METHOD

After considering various possibilities, it was decided that a reasonably complete picture of the areal distribution of cultural groups in Worcester could best be obtained through recording on a map the results of sample interviews taken at regularly-spaced intervals throughout the city.

Scientists in allied fields have used interviews to gather information of social nature. Whetten and Green in their work on ethnic groups in a rural section of Connecticut, secured data by house to house interviews, but their work amounted to a complete census.[1] In the Worcester study a procedure of interviewing and of mapping social data was used that yielded fairly accurate information and, at the same time, very considerably cut down the tedious work of taking a complete inventory.

The value of the interview method for the purpose of locating patterns seemed to depend upon how it was to be handled. Completely free interviewing of a portion of the whole, as in random sampling, might give a proper proportion of cultural groups in the city but would not show their relations to place. Therefore, a grid pattern was adopted for interview control. A grid was superimposed on the city street pattern the lines spaced at quarter-mile intervals (Fig. 1). People were interviewed near the intersection of the grid lines and at the center of each grid square. This placed interviewing points a short distance apart.

Interviews at the points designated were made at random, that is, without selection as to sex, nationality, social or economic status, or age, except for the avoidance of young children. Two interviews per place, rather than one, were made in order to lessen chances for inaccuracies. In densely-populated sections from three to six persons were contacted per interview point.

All interviewing was undertaken by one individual. The questioning was informal. Questions had frequently to be restated to fit the understanding of those being interviewed. Explanations had to accompany the questions, at times, in order to obtain clear answers.

Typical questions were as follows: "Are most of the people, that is over half of them, in this neighborhood, the

[1] Nathan L. Whetten and Arnold W. Green: *Ethnic Group Relations in a Rural Area of Connecticut*, Storrs Agr. Exp. Station Bulletin 244, University of Connecticut, Storrs, 1943, p. 6.

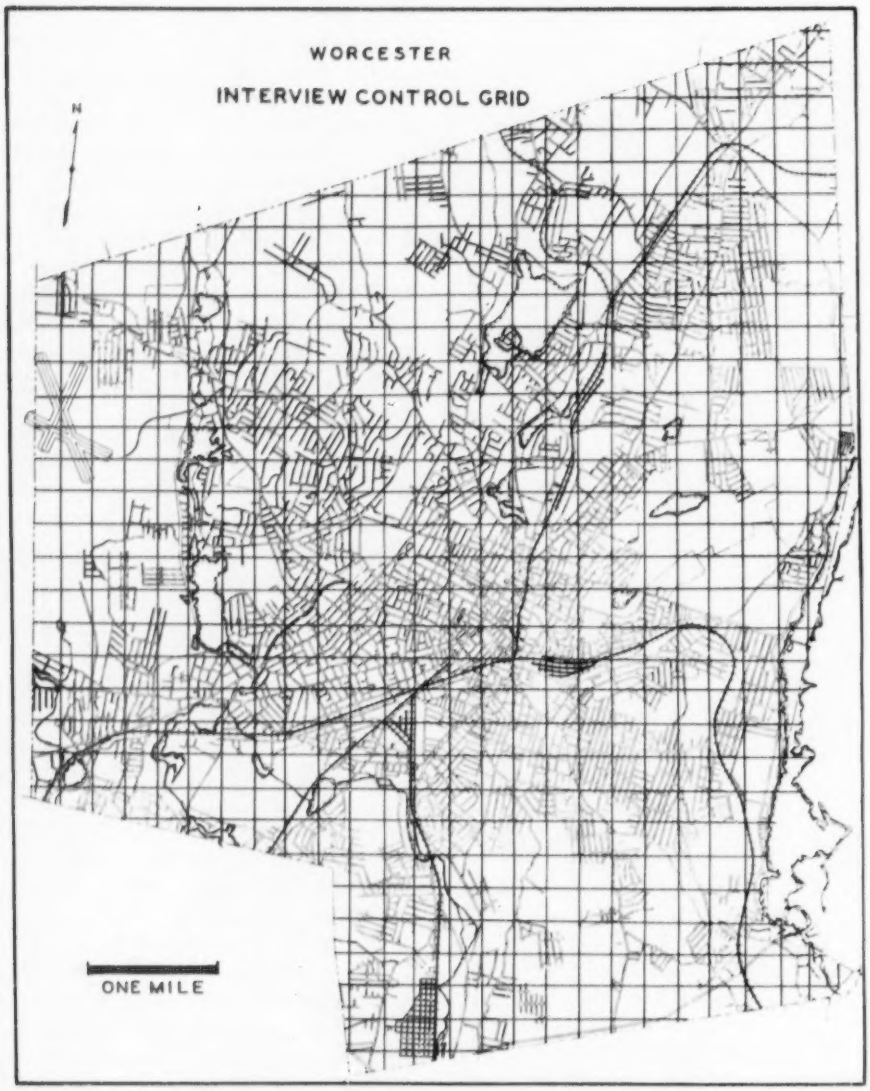

FIG. 1. A grid pattern was laid out on the Worcester map, and people were interviewed at the intersections and at the center of each grid square.

descendants of one certain group?" "Group" was explained to apply to Negroes, Yankees, and Jews as well as to nationalities. If the answer was "Yes," then the question "What group?" followed. If the answer was "No, they are mixed," then questions as to the proportions of peoples were asked. For example, the question might be asked, "Do two groups taken together or three groups taken together equal half or more of the people in this neighbor-

hood?" Questioning along this line continued until the person interviewed told what he could of the groups in the vicinity and of their relative numbers.

A notebook was used to record data. Numbers placed in the notebook corresponded to numbers placed at interview points on the grid map. Thus, data concerning the various cultural groups at these points could later be transferred easily to a map.

THE MAP

In order to transfer data concerning cultural groups to a map it was first necessary to specify types of group areas. Areas were classified as to the proportion of the population within their boundaries that belonged to distinct cultural units. Areas having a predominant cultural group were taken to be those in which one-half or more of the population belonged to one cultural unit.

Areas having two groups predominating were those in which members of two cultural groups together equaled or exceeded one-half the population. Similarly, areas of three groups predominating were recognized. The groups may or may not have blended to form a community.

Areas designated as "mixed" represented sections including peoples from several cultural groups and ones in which there was little tendency for one or more groups to dominate. Usually, such mixed areas were culturally heterogeneous.

More often than not the name of a nationality best served as a title for a cultural group. With some exceptions, in the Worcester study, nationality was used to identify cultural groups. The three outstanding exceptions were the Jews, the Yankees, and the Negroes. Religion, social customs, and traditions were the chief factors uniting the Jews. Yankee, as defined in this study, referred to people of English stock who had been in New England for several generations. Negroes were distinguished by their race and color. Social non-acceptability of Negroes by white peoples and their lower economic status worked to keep these people together in a distinct unit.

After interviewing and after defining various classes of areas, it was necessary to transfer the data to produce a cultural pattern map. The information obtained was examined and a generalization of the data concerning each interview point was made. Colors were used on the map to indicate the particular group or group combination residing at each place visited. In this article, to lessen costs of reproduction, patterns are substituted for the colors used on the original map. Along with placing information on the map at these points it was necessary to interpolate and make generalizations, also, for the interpoints. Finally, generalized cultural group boundaries were drawn (Fig. 2).

CHECKING THE MAP

An important problem that arose upon the completion of the cultural pattern map was to find means of checking the map's accuracy. The information upon which the map was based was of a subjective nature. It was necessarily so, as statistical data were not available to measure the cultural group pattern; hence, checking was limited to non-mathematical procedures. Several methods were used in checking, partly because no one method seemed to offer a complete check on information over all parts of the city.

Mail carriers were interviewed whenever encountered throughout the city during the interview period. This served as a continuing check against responses of residents. With a few exceptions, the information received

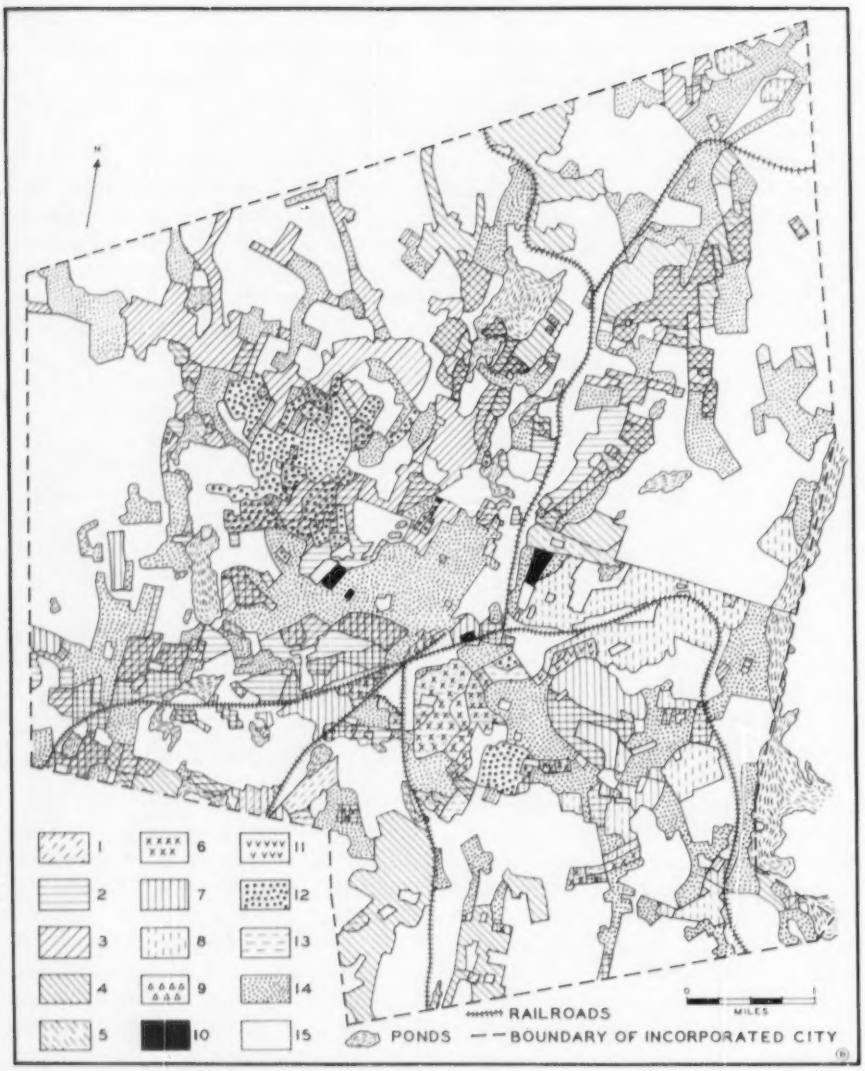

FIG. 2. Predominant cultural groups in Worcester. Numbers refer as follows: 1, English; 2, Irish; 3, Yankee; 4, Swedish; 5, Finnish; 6, Polish; 7, French; 8, Italian; 9, Albanian; 10, Negro; 11, Syrian; 12, Jewish; 13, Lithuanian; 14, very mixed; 15, non-residential. A single pattern indicates that at least one-half of the population belongs to that particular group. Two patterns mean that the two groups together equal at least one-half of the population within the area. Three patterns indicate that the three groups together similarly predominate.

from mail carriers substantiated the results of the interviewing of residents.

The location of churches one-half or more of whose members belong to particular cultural groups was mapped. Their locations correspond well with many group areas as may be seen by comparing the map of Catholic churches

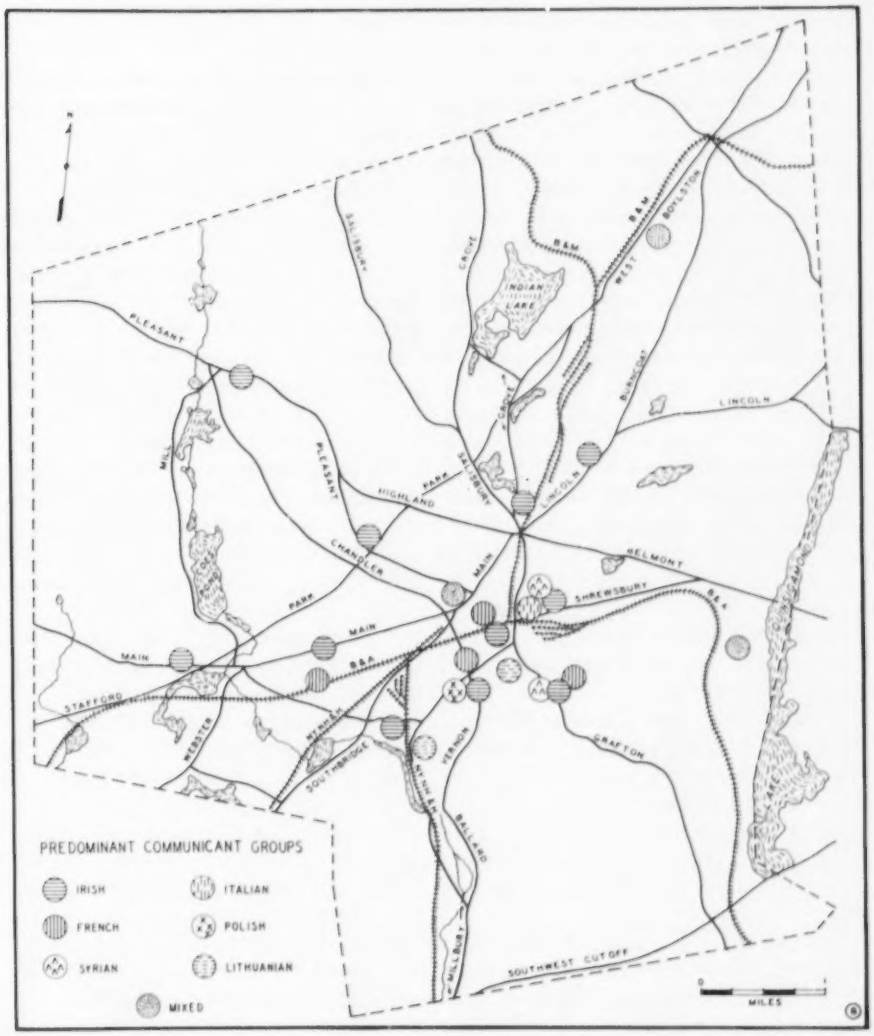

FIG. 3. The map of Worcester's Catholic churches, 1951, reflects many of the features of the cultural groups map.

with the cultural groups map (Figs. 2 and 3). Protestant churches and synagogues also were mapped and similar correspondence found. The relationship was particularly evident in the cases of churches whose services were carried on in foreign languages. Conferences held with the pastors of many of these churches yielded information that served to check the results of interviewing. Here was found a remarkable correspondence of opinion as to the cultural make-up of the population.

A map was made showing the location of prominent clubs, shops, and service centers catering to particular groups.

Most of these cultural features were located within or near areas of their respective cultural groups. This map served to indicate that correspondence did exist between the location of these cultural features and the information obtained through interviewing.

The use of spot checking of family names from a city directory for comparison with locations of certain cultural groups was tried but was found to be of limited value. For instance, no appreciable differences existed in the names of many Negroes and Yankees. In addition, many people had changed family names for the sake of convenience.

An interesting check of the interview data was made by conferences with representatives of agencies whose work caused them to be familiar with the distribution of various peoples in the city. These included the Postmaster, whose hobby for many years had been following the location of different nationality groups in Worcester. Others were associated with the District Nursing Association, a large milk distributing firm, the Worcester Housing Authority, and Friendly House (a social agency). There was general agreement that the cultural pattern map well represented the distribution of cultural groups in the city.

The map was displayed in a public place and critical comment was solicited. Considerable interest was shown, and most of the comment supported the distribution of cultural groups as indicated on the map.

Interpretation of the Pattern

Besides determining the pattern of cultural groups in the city, the study included an interpretation of the pattern. The location of distinct groups were compared with certain physical, cultural, and economic features of the city. Maps of relief, population density, land use, and monthly rents for dwelling units were used.

The cultural groups pattern proved to be one of extreme irregularity. This was due mainly to the large number of group areas, and to the irregular distribution of the population in general.

A comparison of the cultural groups pattern with the pattern of land use indicated that a close relationship existed between industries and certain cultural groups. Many areas near factories were occupied by the more recently-arrived immigrant groups which maintained close ties to their particular churches, clubs, and social institutions.

By comparing average monthly rents of housing units with the locations of cultural groups a close relationship was observed between high-rent areas and the location of old, established groups in the city, such as the Yankees. On the other hand, low-rent areas often corresponded closely with sections occupied by other particular groups.

Areas of concentration of each cultural group were analyzed in relation to housing rents; nearness to places of employment; proximity to churches, parochial schools, and clubs; and to the city transportation pattern. Factors influencing the location of various groups were evaluated and dominant areas were noted. Comparison of the present and past locations of certain groups were arrived at by historical reference.

Conclusions

The use of sample interviews to obtain data for the construction of a map showing a reasonably complete picture of the areal distribution of cultural groups in Worcester appeared to be successful. With the results of the various methods of checking on the interview data evaluated, especially in view of the fact that such checks revealed only minor errors, it was concluded that the procedure

yielded satisfactory results. Additional measures may well be devised by others to further check the accuracy of the results of similar interviewing. A survey using more widely spaced intervals might well be undertaken to ascertain whether comparable results could be obtained with less time spent in interviewing.

A map and study such as this has possibilities of practical application. In Worcester, the District Nursing Association requested a copy of the map for use in its educational program for visiting nurses working throughout the city. Other social agencies and the public schools find such information of value in planning services for neighborhoods having differing social needs. Retail stores and professional peoples who cater to particular needs use such information in locating new markets. Recent correspondence with a member of the research department of a large food store chain indicated an interest in this approach to delimiting cultural areas for marketing purposes. In Worcester, the leading newspaper welcomed the results of the survey as a valuable addition to information on the cultural make-up of the city; and the Chamber of Commerce requested and obtained a copy of the cultural groups map for reference use. There are a number of other potential uses for such a map.

BOOK REVIEWS

Conserving Natural Resources: Principles and Practice in a Democracy, by SHIRLEY W. ALLEN. ix and 347 pp.; maps, ills., diagrs., bibliogr., index. McGraw-Hill Book Co., New York, 1955. $5.50. 9 x 6 inches.

Almost everyone has had the experience of being presented with a complex picture-puzzle and being told that there is a hidden hunter or tiger to be found in the puzzle. One twists and turns the picture, projects lines, tries to focus on special parts of the picture and ignore others, to no avail; until suddenly the desired form takes shape. And then it becomes virtually impossible to look at the picture without seeing the hidden form. Were it not for the humility induced by one's own previous inability to see the configuration, one would conclude that the picture is so simple and obvious that anyone who cannot see immediately the hidden form must be unusually incompetent visually.

We might draw an analogy between seeing the hidden form in a picture puzzle, and in grasping a new idea in social science. Once we thoroughly grasp a concept it becomes obvious; but until we do, it is difficult to see. If we expect a neophyte to see quickly the configurations of a whole series of new ideas it is not enough to tell the student that there is a hunter or tiger in the picture. It is necessary to point it out and emphasize a few lines.

To carry our analogy one step further: Professor emeritus Allen sees the hidden tiger too clearly; it is too obvious to him. His knowledge and insight in the matters of resource conservation are too great to be sustained by his interest in instruction.

In short, the reviewer's principal quarrel with this volume is a pedagogical one. The author has had long experience in the conservation field and has obtained great wisdom and insight into conservation matters. Moreover, he has set forth the problems and the solutions to some of them very soundly; but he does it in a manner which is so sketchy, almost offhand, that the reviewer is convinced that a student would never really see the essential points. On page 195, for example, he writes: "Conservation problems on the national forests are continually arising. Among them, the reconciling of recreation use with such pressing demands as timber growing and harvesting, grazing of domestic livestock, mining, commercial occupancy of land for stores, sawmills, and mining installations constitute the most serious. The term *multiple use* implies a kind of planning supervision and judgment in administration that is not easy and for which manpower is not always available." There is a little more, but essentially this is the statement of the problems of administering the national forests. One can easily imagine all of the subsidiary ideas, the examples, and the ancillary forest problems that were in Mr. Allen's mind as he wrote those sentences; but it seems extremely doubtful whether an uninitiated reader would catch even a glimmer of the problems that are suggested (the most descriptive word to use) by the quoted statements.

The book is similar in general structure to the other standard college texts on conservation. The same topics are discussed. Approximately the standard classification of resources is used and the materials appearing under each resource group heading are handled in the same general way. The author has introduced a great deal of pertinent material under the various resource discussions that does not appear in other standard texts. However, much information appearing in other standard texts is not included in this one; consequently the net result is about the same. Since the general approach and structure of the whole volume are cut to the standard pattern, the conservation teacher will decide whether to purchase on the basis of style (pleasant and informal), materials, and size.

W. C. CALEF

University of Chicago

Oxford Economic Atlas of the World. viii, 113 pp. of colored maps, 152 pp. of statistical index. Prepared by The Economist Intelligence Unit and the Cartographic Department of the Clarendon Press. Oxford University Press, 1954. $4.80. 10½ x 8 inches.

This is an extraordinary book in many ways. An astonishing amount of information is packed into a small volume but in such orderly fashion that it is all readily accessible. It is refreshingly honest in dating and footnoting of statistics, symbolization of known production areas for which there are no statistics, explanation of methodology, and frank statement of limitations inherent in both statistics and map information. To an unusual degree the problems of a variety of users of such an atlas—students, teachers, researchers, executives, and the general public—have been thought out and neatly resolved.

After double-page physical maps of each of the continents except Antarctica, the first part of

the atlas has commodity maps grouped by conventional broad categories, e.g., cereals, and accompanied by text and graphs. The second part, separately paginated and entitled Index, presents tables by countries covering area, land use, population, communications, currency unit, and commodity production, export and import, both pre-war and for 1948–50. Since this world atlas is to be followed by a series of regional atlases that will present more details, no economic maps are included for parts of the world except the map of wine production in the western Mediterranean.

The majority of the commodity maps convey their message practically at a glance, thanks to the use of colors, good choice of dot unit and size, well-adjusted dot distribution, uncluttered design, and an equal-area projection that gets the land area of the world on an 8 x 10 sheet at the scale of 1:100 million. Comparison of the maps in each commodity group is made easy by use of a uniform dot value and by conversion of production figures to the same unit.

A fold-out key map supplies names of countries, leaving only names of producing centers or regions to go on the individual maps. The use of color and carefully selected dot size and value permits combining two, sometimes three, related commodities on a page, serving the double purpose of facilitating comparison and keeping the book small.

The book is not perfect. In general the manufacturing industry maps and accompanying text are less well done than those for foods and raw materials, though they are more than adequate. Inclusion of a map of "international blocs" as of March 1954 seems of questionable value to the reviewer; the general maps of soils, vegetation, and agriculture will probably not suit all geographers, nor will the absence of a climatic regions map; the forest map may convey an exaggerated idea of the dispersal of timber production, or the notion that all tropical forest trees are hardwoods; the indication of the Fairbanks area as the only part of Alaska more than sparsely populated is inaccurate—the Anchorage-Matanuska area has many more people. However, the faults observed are obviously minor. Expert planning, collaborative effort, and skillful execution have been combined by the Intelligence Unit of the Economist and the Cartographic Department of the Clarendon Press, advised by four British and two American geographers. The result is excellent.

The volume offers interesting possibilities to the teacher of economic geography who wants to "organize his own course" and not have to accept that of the author of a text. For reference by researchers or executives it is both convenient to have at one's elbow and small enough to warrant a place there.

MEREDITH F. BURRILL

Chevy Chase, Maryland

Minerals in Modern Industry, by WALTER H. VOSKUIL. vii and 324 pp.; maps, diagrs., tables, bibliogr., index. McGraw-Hill Book Company, New York, 1955. $5.75. 9 x 6 inches.

"This book takes the reader, step by step, from the functions of minerals in industry through the interests of the United States in the distribution and extent of the world's mineral resources," states the author in his preface. He carries this idea through faithfully, and with an excellent developmental approach and careful organization.

Dr. Voskuil discusses the iron and coal situation at length. It is correct for him to emphasize the fact that an industrial society is based on iron and coking coal, but it does not necessarily follow, as he repeatedly states, that steel is the prime mover of our modern economy. Indeed, machine techniques have forced industry to produce the flood of iron and steel as raw material.

He next presents the functions, distribution, and general problems of the other fuel sources, and closes this division with an interesting summary of the alternative fuels. In all, about 60 per cent of the book is devoted to iron and fuels.

The nonferrous and light metals, building materials, mineral plant foods, and sulfur are discussed in moderate detail.

There are two concluding chapters. The American Mineral Policy is excellent, even though Voskuil underestimates the wealth and capabilities of large corporations. The relation of Industrial Nations to Undeveloped Areas is a good review. Students must be impressed with the magnitude and complexity of the free world's mineral problems.

Although this is a factual book it includes brief informative sections which supplement the distribution and quantity figures. These help the reader to understand the competitive nature of the mineral industries. The selective bibliographies at the ends of the chapters are useful but omit a number of fine reports.

Two dozen maps have been reproduced but many of them, especially the series of world outline maps, are, when not misleading or meaningless, downright inaccurate. Not all of the maps show the type of quantitative information indicated by their titles.

It is disappointing that a book by anyone of Voskuil's authority should contain such a large number of avoidable errors. Some are errors in location: for instance, Sidon is placed in Israel. There are errors in fact as when Paulsboro, New Jersey, is given a steel plant. The statement that Britain's steel production would continue to decline in the postwar period is an example of error in judgment, and the lack of any mention of Germany's Salzgitter-Peine iron ore deposit is one error of omission.

In most instances the statistical data is recent, while in others older information has been used even though more recent figures were available. The author defends his use of the various estimates of mineral reserves made by different experts. Notwithstanding this defense, the student is likely to be disconcerted by the wide divergencies he finds among the sets of figures and by the lack of agreement between text and tables. Table 1, The Distribution of Coking Coal Reserves, taxes credulity.

Minerals in World Industry, in spite of its deficiencies, is a good summary of basic world minerals. Its non-technical style is suited both to the lay reader interested in the place of minerals in the world economy and to the general student. For the advanced student who has had a good course in economic geography or mineral deposits, a fuller treatment of the subject is warranted.

OSWALD SCHMIDT

University of Pittsburgh

The Romanian Oil Industry, by CONSTANTIN N. JORDAN. xv and 357 pp.; map, tables, bibliogr., index. Published for the Mid-European Studies Center by New York University Press, New York, 1955. $10.00. 9½ by 6½ inches.

Over a hundred years ago a committee of geographers in London desired to assemble information on the geography of Interior Central Africa. Since this part of the world was virtually inaccessible to Europeans, the committee had to obtain its data primarily from Arab, and other, traders in the bazaars of coastal Africa. Today, much the same techniques have to be applied to gather information on the situation in the countries under Soviet domination. Committees of experts scan and assemble the data obtained from publicity releases and refugees of the area, as well as the gossip current in the latter day "bazaars" of Berlin and Vienna, which usually finds its way into western newspapers. One of these committees of experts is the Mid-European Studies Center of the Free Europe Committee which has sponsored this valuable study of "the probable position of the Romanian oil industry at the end of 1952" (p. xiii). In contrast to the early students of Central African geography the author of the study resided until 1947 in the area which he describes, and is thoroughly familiar with the operations of the oil industry up to that time.

Of interest to geographers are the author's observations on the marketing of Romanian oil. Whilst in pre-war days the Mediterranean region was the "natural" market for Romanian oil, today the larger quantities of Middle East oil available there would probably have diminished "the importance of Romania" in this area (p. 2). However, Romania is well located to supply the Ukraine and Western Russia, for these regions cannot be satisfactorily supplied by Russian oil fields due to the absence of an adequate internal transportation system. Thus Odessa is supplied by the Ploeşti-Brăila-Reni pipeline, as well as by tanker from Constanţa. The author believes that, apart from the quantitative significance of Romanian oil to the Soviet economy, the geographical position of Romanian oil fields in relation to the location of Russian consumption areas is responsible for the considerable Soviet effort to raise Romanian oil production.

The book describes the various stages in the "communisation" (Chapt. 3) of the Romanian oil industry. This process also resulted in the organization of the Romanian oil industry by geographical or geological districts, instead of by geographically heterogeneous firms. In his conclusions the author takes up the question of what will happen to these Russian innovations if and when Romania is liberated. He regards the "restoration of the status quo ante . . . [as] an illusion," since oil-field equipment, "mobile by nature," cannot be restored to the previous owners (p. 299). He suggests that the liberated oil industry be reorganized in a few large economic units which presumably would preserve the geographical reorganization of the industry carried out under Soviet control.

Regarding crude oil production the author states that "the Soviet Union's activity in the Romanian oil fields is evidence of an extreme desire to drain Romania's subsoil in the shortest possible time" (p. 165). In view of the comparative exhaustion of the major existing Romanian oilfields he adds that "it is a safe assumption that the communists would concentrate their entire technical potential upon the development of any new region (in Romania) proved oil-bearing" (p. 165). These statements are corroborated by an interesting discussion of the efforts made to discover additional oil in Moldavia, which resulted in a seven to ninefold increase of oil production in this region since the war. Similar efforts are also described for the Dâmboviţa and Oltenia regions (both west of Ploeşti). Only sporadic drilling took place in Banat and Transylvania which produced no results. Based on his research the author estimates that Romania produced 6,470,000 metric tons of crude oil in 1952, compared with 3,804,000 tons in 1947. The book contains little information on the geological background of oil production since 1947.

One map illustrates the location of new exploratory wells and of producing oil fields.

ALEXANDER MELAMID

New School for Social Research

Kulturgeografisk Atlas, by JOHANNES HUMLUN. 3d edit. I. Atlas, 127 pp. of maps, with table of contents, preface, explanation of the maps, and source references. II. Tekstbind, 320 pp. of maps, drawings, ills., tables, bibliogr., index. Glydendalske Boghandel. Nordisk Forlag, Copenhagen, 1955. I. Atlas, Danish Kr. 19.50, paper; 23.50, cloth. II. Tekstbind, Kr. 26.50, paper; 31.50. Each volume 10½ x 7 inches.

According to the jacket blurb, this book deals with some essential facets of the geography of civilization, of mankind's distribution over the earth and his extremely variable utilization of it under different natural conditions, such as the dry-farming land use in America's rain-deficient prairies and the highly developed use of irrigation in two of the old world's centers of civilization, the gigantic desert oases of Egypt and Iraq. There is discussion also of the use of water as a source of energy, and of the almost inconceivable amount of energy produced in the world's largest hydroelectric power plants, such as Grand Coulee in America and Mount Snowy, under construction in Australia. In common with these power developments is their significance in connection with the development of atomic weapons, one of the most requiring users of energy. More important, however, are their peaceful uses, such as are found in the multipurpose projects of the Tennessee watershed in the United States and of the Damodar basin in India, where flood control, electric power production, and industrial development are combined to benefit the population in the basin uplands and beyond.

Agricultural, silvicultural, and fishery production is therefore one of the main topics of the book. Another is the production of raw materials for energy—coal and oil—and a third the mining of ores—iron, copper, bauxite, and others—essential for modern industrial progress.

The text volume has more than 200 illustrations—photographs, maps, drawings, and diagrams—that illustrate essential facts discussed. Most of the photographs are original, taken by the author on journeys in Europe and central Asia, during a year's sojourn in the United States, or in East Pakistan where he worked for a year with UNESCO. Great emphasis is laid on the provision of up-to-date photographs, most of which have been taken during recent years. Illustrative material therefore corresponds fully with the text which has been completely rewritten and provides post-war human and industrial geographic background for actual economic and political situations. Professor Humlun, who is head of the geography department at the University of Aarhus, Denmark, is a human geographer. That classification is reflected here in the cultural aspect of a work which, with less emphasis on mankind, would be classed as economic geography.

In the nearly 300 pages of text, the author has treated the several topics concisely and in straightforward fashion. Beginning with the geography of the world's population, he then treats in turn agriculture and its relation to water supply, the important categories of agricultural commodities, hunting and fishing, forestry and related industries, mining and the mineral industries, and water power. The text is generously supplied with scientific names of both plants and animals. The characteristics that make these plants and animals useful to man are discussed, together with their places of origin, general distribution and extent, comparative importance, and total production. Maps, illustrative pictures, diagrams, and botanical enlargements help to create a common reality ordinarily lacking in such an encyclopaedic work. A sectional bibliography and common index complete the text volume, which is written in Danish throughout.

In earlier editions the work consisted of one volume. This, the third edition, has separate text and atlas volumes. The atlas is said to contain 127 principal maps and 336 subordinate ones. For clarity of illustration, as a rule, only one topic is considered on each map. Some of the maps deal with population (the consuming force), economically important animals (providers of animal products and services), and waterpower, but most of the maps give geographical representation of production and trade in the world's most important raw materials, with only some basic industrial products included. Production figures are for post-World War II years wherever it has been possible to obtain them. In some instances reasonable estimates have been necessary, and for countries where recent figures are lacking, the most recent available ones, generally 1934–1938, have been utilized.

The basic maps are of standard projection, uniformly documented and referable to one another. In most cases there are two world maps on a double page, one dealing with production and the other with trade in the same commodity. Accompanying these are large scale maps of localities significant in the particular commodity production and trade. The whole work has a distinct commodity approach, and is in no sense a regional compilation.

Experience has shown that the atlas is useful not only as a textbook in higher institutions of learning but also as a reference work. To increase its usefulness both the total number of maps and amount of text material have been increased in the present edition. In the atlas volume all writing is reproduced in four different languages—Danish, German, French, and English. Because the volumes can be bought separately the atlas volume is therefore available for use outside of Scandinavia.

There is need for a handy reference work such as this. It has the distinct advantage of presenting a wealth of material in its simplest form and in such manner that combination and coordina-

tion are invited. To the teacher of social studies especially, access to this two-volume edition should be a distinct asset.

CLARA ROM LOUGEE

Worcester, Mass.

The Lost Villages of England, by MAURICE BERESFORD. 445 pp.; maps, ills., index. Philosophical Library, New York, 1954. $12.00. 8½ x 5½ inches.

Mr. Beresford, lecturer in economic history in the University of Leeds, England, has presented a study in the medieval history of the English landscape, with all the excitement of a detective story. It is written in an easy and attractive style that invites reading, but is at the same time scholarly. The Philosophical Library of New York is to be congratulated on its enterprise in publishing a work on a topic that is remote from the experience of the American reader.

The book is of especial interest to the reviewer since it clearly demonstrates a new trend in the study of the landscape, that involves the methods of the historian, the archeologist, and the geographer. Some of the younger medieval historians, following the advice of one of their revered seniors, have taken a "strong dose of boots." With Ordnance Survey map in hand, and aided by pick and shovel, they set out into the countryside in search of the evidences of the medieval document. They have turned, like the archeologist, to the aerial photograph for evidence that may be unrecognizable on the ground. Beresford also uses effectively geographic techniques, counts geographers among his colleagues and co-field-workers, and has presented his results to the professional geographers. All this speaks of the heightened interest in what geographers like to call the "cultural landscape," a field to which an ardent and able group of medieval historians, led by Dr. W. G. Hoskins (see his *Making of the English Landscape*, London, 1954), have made substantial contributions in recent years and have, moreover, presented them effectively to the general public.

This study is concerned with the villages that were abandoned for the most part in the period from 1450 to 1550 owing to the forced eviction of small husbandmen from their strips in the open arable fields by grass-graziers bent on accruing wealth from the sale of wool. Though the object of public enquiry in the 16th century and the cause of unrest and poverty among the peasantry, depopulation has been underestimated by modern scholars. The new generation of scholars is proving its range and significance. Beresford gives details of the sites he has visited where the earthworks and ruins of abandoned buildings and surviving ground-patterns of the ridge and furrow of the old arable open fields give undisputable evidence of what were originally small villages. He can testify to about 400 of these lost villages and lists a total of over 1000 from medieval records.

The author maps the distribution of the depopulated settlements or certain counties which he has thoroughly examined in the field and more generally for England and Wales as a whole. The lost villages are found to be most frequent in what are now the "grassy shires" of the Midland Counties, and in large tracts of land in the eastern counties (parts of Norfolk, Lincolnshire, and Yorkshire) where grassland and arable did well and were in "delicate balance." The Midlands was the main area of enforced enclosure of open fields of this period. The eastern areas were dominantly open arable fields in the 14th century, passed in many sectors to grass in the 15th and 16 centuries, and then, subsequently, reverted to arable during the great parliamentary enclosures of the 18th century. This displacement of the open fields and their husbandmen by the consolidated fields of the single grazier for the production of wool was something to which most of the country was immune. Such were the great areas in which the open field strip system had already been converted to enclosed land in the southeast; and where forest and pastures were dominant with only scattered patches of open arable land, as in the west and southwest. The recently reclaimed lands of fen and marsh, that were most profitably adapted to grain, were also resistant to the encroachments of the grazier.

The author does not fear to present to the general reader the techniques and problems of the medieval scholar and his thorough discussions of medieval sources and their problems are never dull. Concluding chapters contain lists of sites and suggestions to future workers in England where to do their leg work and dig. The book is well illustrated and has several excellent distribution maps.

I recommend this work to geographers as a very concrete illustration of the complex problems which the student of the "cultural landscape" in the Old World must face. Such studies demand investigation through many years in narrowly defined locales, patiently piecing together the complicated items of an elusive jigsaw. This is another important pioneer work in the English field that, in comparison with similar studies by historians and geographers on the continent, is long overdue, and both author and publisher are refreshingly mindful of the cultural value of their work and findings to the general reader.

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